Date.	Duration.	Force from		General Direction from	Duration.	Force from		General Direction from
Jan.		S.	E. or W.			N.	E. or W.	
1	0 h.m. to 6 h.m.	10	7	S.S.W.	6 h.m. to 1 fol. m.	5	3	N.N.W.
2	1 m. ,, 8 m.	9	8	S.W.	8 m. ,, 1 ,,	4	4	N.E.
3	1 m. ,, 10 m.	8	8	,,	10 m. ,, 1 ,,	4	4	,,
4	1 m. ,, noon	5	11	W.S.W.	Noon ,, 2 ,,	2	5	E.N.E.
5	2 m. ,, 2 a.	3	12	W. by S.	2 a. ,, 2 ,,	1	6	E. by N.
6	2 m. ,, 4 a.	0	14	W.	4 a. ,, 3 ,,	0	7	E.
7	4 a. ,, 4 fol. m.	1	6	E. by S.	3 m. to 4 a.	3	12	W. by N.
8	5 a. ,, 4 ,,	2	5	E.S.E.	4 m. ,, 5 a.	5	11	W. N.W.
9	6 a. ,, 3 ,,	3	5	,,	4 m. ,, 6 a.	6	10	,,
10	8 a. ,, 3 ,,	4	3	S.E.	3 m. ,, 8 a.	9	7	N.W.
11	9 a. ,, 3 ,,	5	2	S.S.W.	3 m. ,, 9 a.	11	5	N.N.W.
12	10 a. ,, 4 ,,	6	1	,,	3 m. ,, 10 a.	13	3	,,
13	11 a. ,, 5 ,,	6	2	,,	4 m. ,, 11 a.	12	4	,,
14	11 a. ,, 6 ,,	6	2	,,	5 m. ,, 11 a.	12	4	,,
15	... ...	...	...	...	6 m. ,, midnight	12	3	,,
16	0 m. to 7 m.	5	2	S.S.W.	7 m. ,, 1 next m.	11	4	N.N.E.
17	1 m. ,, 9 m.	4	2	S.W.	9 m. ,, 2 ,,	9	5	N.E.
18	2 m. ,, noon	3	4	W.S.W.	Noon ,, 2 ,,	6	8	E.N.E.
19	2 m. ,, 2 a.	1	6	W. by S.	2 a. ,, 2 ,,	2	12	E. by N.
20	2 a. to 4 fol. m.	1	14	E.	2 m. ,, 2 a.	0	7	W.
21	4 a. ,, 3 ,,	5	10	E.S.E.	4 m. ,, 4 a.	2	5	W.N.W.
22	6 a. ,, 2 ,,	7	9	S.E.	3 m. ,, 6 a.	3	4	N.W.
23	7 a. ,, 2 ,,	9	8	,,	2 m. ,, 7 a.	4	4	,,
24	8 a. ,, 2 ,,	11	6	S.S.W.	2 m. ,, 8 a.	5	3	N.N.W.
25	8 a. ,, 2 ,,	11	7	,,	2 m. ,, 8 a.	5	3	,,
26	9 a. ,, 3 ,,	11	7	,,	2 m. ,, 9 a.	5	3	,,
27	10 a. ,, 4 ,,	11	7	,,	3 m. ,, 10 a.	5	3	,,
28	11 a. ,, 5 ,,	10	8	S.W.	4 m. ,, 11 a.	5	4	N.W.
29	11 a. ,, 6 ,,	9	8	,,	5 m. ,, 11 a.	4	4	,,
30	11 a. ,, 8 ,,	8	9	,,	6 m. ,, 11 a.	4	4	,,
31	... ...	...	...	...	8 m. ,, midnight.	3	5	W.N.W.

The Nautical magazine

"The Seas but Join the Nations they Divide."

THE

NAUTICAL MAGAZINE

FOR 1879.

NEW SERIES.

A JOURNAL OF PAPERS

ON SUBJECTS CONNECTED WITH

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VOLUME XLVIII.

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VOLUME XLVIII.—No. I.

JANUARY, 1879.

STEEL FOR SHIPBUILDING.

(*Continued from page* 968, *Vol.* 47.)

THE paper read at the meeting of the "Iron and Steel Institute," by Mr. Daniel Adamson, on the mechanical and other properties of iron and mild steel is fully as interesting as that by Professor Akerman, to which we have already referred. Mr. Adamson has conducted a large series of experiments on iron of various qualities, on mild steels, and on steel more highly carbonised, and his experiments afford much information as to the behaviour of the several metals when broken by the ordinary tensile test, when exposed to concussive strains, and when subjected to corrosion in a bath of diluted sulphuric acid, the experiments in each case being of especial value from the fact that a statement of the exact chemical composition of each plate is given. He has also experimented upon the mechanical properties of various kinds of the metal when subjected to a temperature of about 600° Fahr.

In the first series of experiments a cast iron anvil block was used having a hole gouged out of its upper surface in the form of a segment of a sphere ten inches in diameter, and four inches deep. The plate to be experimented upon was laid upon the anvil, and

then gun-cotton was exploded at a height of ten inches above it, the result of course being that the plate was bent or broken so as to be forced down into the hole in the anvil. Various kinds of metal were experimented upon in this way, and the specimens were exhibited by Mr. Adamson as illustrating the capability of the respective metals for enduring a great concussive force. The metals compared were four specimens of iron, two being of best best boiler plate, one of special class Yorkshire iron, and one of special class Lancashire iron. The steels were two specimens of Bessemer mild steel, one of Martin-Siemens mild steel, and two plates of crucible steel having, however, a low percentage of carbon. One of the crucible steel plates was not annealed, all the other steel plates were.

The result of these experiments was that the four iron plates were cracked and broken. Two of the *annealed* mild steel plates stood the effect of the concussion without a crack, the metal being bent and stretched into a hollow half the depth of the cup in the anvil. These plates were then turned upside down, and a second charge of gun-cotton exploded over them, with the result of producing a second smaller hollow opposite to the first, and still without any cracks. The *annealed* crucible steel plate gave results nearly as favourable. The *unannealed* mild steel plate, however, was cracked and broken as much as the iron plates, and one of the *annealed* Bessemer mild steel plates was also as much cracked and broken as the Lancashire iron plate. Mr. Adamson finds an explanation of the failure of the last-named Bessemer plate in the fact that the analysis shows that it had three times as much sulphur and phosphorus in it as any of the others; it contained ·126 per cent. of sulphur and ·154 per cent. of phosphorus. It must be remarked that the iron plates used were a sixteenth inch thicker than the mild steel, which last were three-eighths of an inch thick. Taking this into account, we can hardly see that the experiments were as favourable to the use of mild steel as would appear at first sight. They prove that it is possible to produce a metal, some specimens of which shall show an extraordinary power of enduring sudden and violent strains; but one plate, which had slipped in with the others, failed as much in the test as the

ordinary iron plates, the reason only appearing after a minute and careful chemical analysis. The steel plate, which was not annealed, though of as good material as the other, stood the test no better than the iron plates.

Pieces of metal of circular shapes were cut out of each of the plates, and a hole being drilled in each, of the size rivet that would be employed in plates of that thickness, the hole was enlarged by a tapering punch being driven into it till the ring burst. The mild steel when annealed showed itself under the test to be much superior to the iron, but here again the purest plates, that is, those containing least phosphorus and sulphur, came off best.

The results of these tests, as might be expected, brought up the question of annealing in the subsequent discussion, and it was stated that the Admiralty have their mild steel annealed after punching in the case of work done in the Royal dockyards, but do not insist upon it in the case of work done for them by private shipbuilders, believing that unless their own officers can so carefully supervise annealing as to make sure that it is properly performed, it had better not be attempted.

We certainly are of opinion that in an ordinary shipbuilding yard it would be impracticable to make use of metal which required such tender treatment.

Mr. Adamson's tensile tests of steel, &c., are, as we have said, valuable, because an exact chemical analysis was made of each, the metal in each plate tested. Various kinds of iron of different degress of purity, mild steels in which the proportion of carbon varied from ·03 to ·22 per cent., and hard steel containing as much as ·4 per cent. of carbon, were tested with results decidedly in favour of the mild steels, more especially the purest and mildest of them. The hard steel stood a maximum strain of 53 tons per square inch, and did not take permanent set till it was subjected to 27 tons per square inch, but its percentage of elongation before breaking was only 14·5, whereas the elongation of the mild steel specimens varied from 21 to 34 per cent., the length in each case being ten inches. The tests prescribed by the Admiralty and Lloyd's for mild steel require a minimum elongation, before fracture, of 20 per cent. in a length of eight inches.

With reference to his experiments upon bending iron when heated to a temperature of about 600° Fahr., Mr. Adamson remarks :—

"It is desirable that the worker of metal should have some experience of the best working heat of any iron or steel that may be under manipulation. A knowledge of the mechanical endurance at variable temperatures is also important to every one, as life and property depend as much upon the efficiency of metallic structures. Few or no malleable metals, such as wrought iron or mild steel, can be found in the open market that possess a range of endurance at all varying temperatures, say from cold up to red heat, but nearly all ordinary bar or boiler iron and mild steels will endure considerable percussive force when cold, and up to 450° Fahr., after which, as the heat is increased, probably to near 700 degrees, they are all more or less treacherous and liable to break up suddenly by percussive action. The poorer class of metals at this temperature, which may be called a colour heat, varying from a light straw to a purple and dark blue, are simply rotten. . . . . The colour heat test ought to be impressed upon all workmen to prevent the hammering of metals when half cold, or the heating of iron by red-hot iron for some final adjustment; where hammering is required it would be a better and wiser policy to only heat the iron with boiling water, or by applying steam against the surface a short time. Finishing forgings or smith's work by hammering at a black heat at all times proves highly injurious unless great care is afterwards used in annealing, and it is questionable then whether the full measure of strength of the metal in many cases is ultimately restored."

The experiments as to the corrosion of iron and mild steel referred to by Mr. Adamson, were carried out by the Weardale Iron Company, Spennymoor, Durham. The pieces of metal were placed in a water bath containing one per cent. of sulphuric acid, for seventeen days, the amount of corrosion being noted each day. The specimens tested were one of common iron, containing as much as ·5 per cent. of phosphorus, two specimens of superior irons, one of hard steel, one of mild steel, and one of a very pure iron, containing as much as 99·9 per cent. of pure metallic iron.

The common iron lost 80 per cent. in the 17 days, the very pure iron only 5 per cent., and the general result of the experiment was that the metal corroded more or less as it was more or less impure. Setting aside the very pure iron, which was merely a curiosity, and would be too soft to be of any practical use, the mild steel came out of the test best, with a loss of only about ten per cent. In the discussion which followed the papers, Mr. Barnaby, of the Admiralty, stated that the result of some experiments made by his directions was not so favourable to mild steel as those of Mr. Adamson. Experiments made with dilute sulphuric acid, indeed, can hardly be relied on as indicating what will take place in sea water. We have heard that the general result of the Admiralty experiments appears to indicate that most of the cases of rapid corrosion are due to galvanic action, in some instances clearly between the black oxide which adheres to the plate, and the parts of the plate where the oxide has been removed. The black oxide is produced on the plate during rolling, being what is technically known as "scale." It is electro-negative with regard to the plate itself, and consequently when some of it is knocked off in the process of working, galvanic action will be set up in salt water between the covered and uncovered portions of the plate. It has been observed that the scale adheres much more firmly to mild steel than to iron, probably on account of the greater homogeneity of the former. It has also been suggested that galvanic action may be set up even when there is no black oxide, between different parts of the same plate, which may slightly vary in composition. We recently ourselves noticed a case of evident galvanic action in a case which would be inexplicable except on the hypothesis that a mixed metal may so vary in composition that some portions of the same plate may differ so much from other adjacent parts as to cause galvanic action between them in sea water. The yellow metal dovetail plate connecting the keel with the stem in a large wooden ship only a year old was clearly pitted, and no other metal was so near it as to be the cause of the mischief.

Evidently more experiments are wanted before anything can be said as to the durability of mild steel, and if such experiments are to be of practical use, the actual condition of the metal in salt

water as it would be in a ship's bottom, supposing the paint rubbed off, must be as nearly as possible reproduced. It is further necessary that a careful analysis be made of each plate experimented upon, especially, we think, with a view of ascertaining the quantity of manganese contained in it. Carbon, sulphur, and the other elements which are present in iron and steel, if present in undue proportions, show their effects in the tests to which it is subjected. Manganese does not do so, and yet it may have as much influence in causing rapid corrosion as any of the more obviously injurious impurities.

SEAMEN COMMITTED TO PRISON.

A CORRESPONDENT has written to us in a hot state of indignation to call attention to the large number of seamen (as he says) cruelly and wickedly committed to prison every year. He writes as if he thought, and probably he does think, that the shipowners and the magistrates are leagued together with a view to sending seamen to prison, either for no offence whatever, or without taking into consideration "the touching and reasonable reasons" they give for leaving their ships. "I am constrained," he says, "to enquire whether we live in a Christian land when I find that, because a fellow-creature is moved by the tenderest feeling and those sympathies which ought to be encouraged and cherished as adding nobility to our nature, he is committed to the common gaol." We have not space in which to continue our correspondent's letter, and it is the more unnecessary, as it is founded on misconception, and written in entire ignorance of the peculiar conditions of sea service. Our correspondent is, however, an accurate man for a philanthropist, and though evidently incapable of listening to reason, shows wonderful power of breaking forth into ready and scornful indignation and vituperation when his feelings are worked upon. We have, ourselves, so much respect and sympathy for the genuineness of his motives, and so much real, because not misapplied interest in our seamen, that we have been at pains to find out what

really is at the bottom of our worthy correspondent's present troubles. In this view we hastened to procure a copy of the return from which he has informed us that he derives his information. It is "a return of all seamen committed to gaol in Great Britain and Ireland for refusing to go to sea, or for desertion, in the years 1875-6-7." The form of the return moved for, and the information given, could not have been devised in a more suitable way if the intention of the mover had been deliberately to mislead, and we therefore do not wonder at our sympathetic correspondent having fallen into error over it, nor that he has formed the conclusions on it with which he has favoured us. For instance, we find amongst other reasons given, the following :—"Left ship to visit a dying father, "wanted to see his wife," "dreamt the ship was going to be lost," "thought the ship's boats were too large," "did not like the ship," "thought the ship was unseaworthy," "did not like the cook," "the crew-space was leaky," &c., &c., and there is not a single word to show whether the plea was good or bad, or was investigated at all; and so it happens that the feeling hearts of persons like our correspondent are smitten; as it has seemed from this return, not that the excuse was silly, unfounded, or irrelevant, but that the men were actually sent to prison because they had left the ship on the grounds stated.

Now, we must look at the facts as we find them, and we find as follows :—

The numbers of seamen, including apprentices and mates, committed to prison during the five years ending 1877 for refusing or neglecting to proceed to sea according to agreement, or for simple desertion, and the number of ships in respect of which they were committed, were as follows :—

Year.	Men committed.	Vessels concerned.	Average number of men to vessels.
1873	632	343 ...	1·84
1874	633	374 ...	1·7
1875	663	387 ...	1·7
1876	634	352 ...	1·8
1877	553	322 ...	1·7
	3115	1778	
Yearly average ...	623	$355\frac{3}{5}$	1·75

Allowing for a residuum, consisting of persons who regard shipowners as lawful prey and the swindling of boarding-house keepers as a pleasant diversion, a residuum who spend a large proportion of their time in gaol, it will be seen on taking these parliamentary returns as a basis that the percentage of deserters to the whole number of seamen in the Mercantile Marine is almost infinitesimal. If it could but be found how many of the men included in the return have appeared in it more than once, then the return would be useful as showing more completely how very little the general body of seamen are affected by the present power of arrest without warrant. As the matter stands, however, it is obvious either that desertion is small, or that shipowners do not rigorously exercise their power of arrest, for we find that the proportion of seamen committed for desertion in the three kingdoms, including repeated convictions, gives only an average of about one in 563, or ·177 per cent. per year. The number of entries and clearances at ports in the United Kingdom for one year show that, as regards voyages (*i.e.*, opportunities of desertion), the above proportions should be greatly reduced. As nearly as can be computed 2,300,000 seamen, reckoning their repeated voyages, enter ports in the United Kingdom in British vessels during one year. It should also be remembered that the returns include committals of apprentices who ran away because they were tired of the sea, or wanted to get rid of their apprenticeship. Foreign vessels are apparently included in the return list, but are not reckoned in calculating this proportion. We may, with certainty, infer from the figures that the number of cases to which Clause 10 of the new Act would have applied were comparatively few. The desertions and refusals in the majority of cases were simply the acts of individuals, and very seldom the acts of one-fourth of the seamen belonging to the ship. As regards the reasons urged by the seamen in justification or extenuation of their desertion, we assume, of course, that they were carefully inquired into, and were deemed by the magistrates to be unfounded or absurd, or committal would not have taken place; but in order to place before our readers all the information that can possibly be gleaned from this very loose return, we have classified the excuses of the men as follows:—

Excuses made by Deserters.		1873.	1874.	1875.	1876.	1877.	Totals.
Unseaworthiness of Vessels	No. of Men ...	139 ...	101 ...	106 ...	66 ...	97 ...	509
	No. of Charges	32 ...	25 ...	24 ...	19 ...	25 ...	125
Drink	No. of Men ..	44 ...	62 ...	52 ...	43 ...	39 ...	240
	No. of Charges	34 ...	48 ...	38 ...	27 ...	32 ...	179
Various Excuses	No. of Men ...	167 ...	180 ...	213 ...	227 ...	136 ...	923
	No. of Charges	79 ...	99 ...	107 ...	97 ...	57 ...	439
No Excuse	No. of Men ...	88 ...	118 ...	165 ...	160 ...	190 ...	721
	No. of Charges	71 ...	83 ...	127 ...	121 ...	136 ...	538
Not stated in Return	No. of Men ...	194 ...	172 ...	127 ...	138 ...	91 ...	722
	No. of Charges	127 ...	119 ...	91 ...	88 ...	72 ...	497
Total Number of Men Committed		632 ...	633 ...	663 ...	634 ...	553	*3115
Total Number of Charges		343 ...	374 ...	387 ...	352 ...	322 ...	1778

As regards the pleas of unseaworthiness, we find that 156 men were committed to prison in 31 cases after the ships had been surveyed and declared seaworthy by the Board of Trade Surveyor. In the cases of 353 men who alleged unseaworthiness, the magistrates did not order, nor did the men demand, any survey.

When we take into consideration the efforts that have been made in late years to convince the public of the general unseaworthiness of merchant ships, and when we read of an eminent philanthropist recently stating on a deputation to the Board of Trade, that "seamen are still sent to prison *because* they refuse to proceed to sea in unseaworthy ships," we are altogether surprised to find that the returns show how little the seaman himself believes in unseaworthiness. It is the more remarkable, because the State affords the seaman the services of a staff of surveyors to do his work gratuitously or at the cost of the owner, while it refuses to the shipowner all aid whatever in the same way even if he is willing to pay for it.

We do indeed see here and there in the return the effect of fear or of folly, as in the plea of one man who deserted because he "dreamt that the ship was going to be lost," and of seven others who deserted because the "ship's boats were too large." In the latter

* In a note under Liverpool we find reference to a batch of cases which are not included in the body of the Return, and cannot therefore be classified.

case, however, the men had received advance notes, but in the case of the dreamer this point is not stated.

"Dislike of ship" is a common excuse, and though it appears to have been looked upon in a general way as an allegation of unseaworthiness, it may possibly have been the first excuse that suggested itself to the men on getting sober, or a simple freak of superstition akin to the ancient objection to sailing on a Friday. It is here worth noting as a fact, before we proceed, that in the majority of cases in which unseaworthiness is urged in any form as a reason for desertion, the men had received advances either in notes or in cash. The fact tells both ways. One side would urge that the seaman was possessed with a desire not to work after having spent his advance, which would be against the seaman; while the other side might regard the fact of having to give an advance note in any case as evidence in favour that the seaman could only be induced to serve in the ship by receiving an advance as an inducement. Those who alleged unseaworthiness in any way, number, however, only one-sixth of the men committed to prison, only one in 3,459 of existing British seamen and only one in about every 23,000 British seamen, including their repeated voyages, who leave a port in the United Kingdom during one year.

There is one fertile cause of desertion which is not properly represented in our table, although we have devoted a separate heading to it. It is drunkenness, which in the case of seamen is generally the outcome of the advance-note system, the stronghold and backbone of that familiar demon, the crimp. Most right-thinking men saw with regret that the last Bill, which would practically have abolished the note and have ruined the crimp, was rendered practically impossible by the inevitable and lengthy discussion which must have followed the retention by the committee of the 4th Clause.

It is well known, though there is no evidence in the return, that the majority of seamen who plead "guilty," or who "gave no reason" for desertion, were the victims of this besetting sin, and we therefore caution our readers against accepting without reserve the figures under the head of drink in our little table. That table

only includes the cases in which drink is "officially" recorded as the cause.

Under the heading of "various" excuses, we find objections to food, beds, &c., undermanning, dislike or brutality of master and mates. Indeed, in one case we find that nine men "refused to go unless mates discharged, which master declined." It is clear, however, that in most instances these allegations of brutality were unfounded, as the men had not joined work, and could scarcely be in a position to judge of the disposition of their officers. There are also other domestic reasons urged in extenuation that are not so much entitled to sympathy as the one quoted by our correspondent. One man "refused to go, or to do any more work unless he could take his wife with him:" another said, "I won't go in her; I want to see the old woman:" another "wanted to see his wife:" another "could not go because his clothes had been pawned by his wife:" another "had a grievance at home," &c., &c., &c. "A sailor's wife a sailor's star shall be" is a very pretty sentiment, but to be consistent it ought to be indulged in before a drinking bout, and before an advance note is spent. Ever since Antony followed his frail bewitcher from the sea fight, and bartered the empire of the world for a kiss, we fear that many a sailor has too often allowed the tender feeling to keep him ashore.

We do not for a moment insinuate that Jack should not marry and become a respectable member of society. On the contrary, marriage might improve him, and in many cases would be a safeguard from a thousand snares, and whilst affording him a "star," for which to steer with gladsome heart, might wean him from the debauchery and riot which too often follow a long voyage. But unfortunately Jack has not many opportunities of cultivating a virtuous attachment, and a seaman's wife is, consequently, sometimes a person rather to be dreaded than cultivated. Thrown on the world as a child, brought up in a training-ship without the remotest opportunity of mixing with the opposite sex, having no chance of cultivating the amenities, he comes ashore after his first voyage, and is "taken in tow," and his experience commences. This is followed by "a wife at every port," and by disease and

remorse at sea. This is a phase of the seaman's life which is worthy of the attention of the philanthropist indeed. It is Jack ashore, and not Jack at sea, that any man, whoever he is, who would improve the sailor, must look after. We have more faith in reformation that might be effected by the influence of lads leaving home with the recollection of mothers and sisters fresh in their hearts, and with a love for home and home ties superior to the attractions offered by the feverish debauch so persistently placed before them under the licensing laws, and by the crimp and his coadjutor the harlot, than we have in any movement, however sensational, founded in an attack on British ships and British shipowners. A means of spending time in port, which shall be a happy medium between a barrack home and revival prayer meeting on the one hand, and a drinking shop and brothel on the other hand, would do more to improve the moral condition of our seamen than all the legislation that will ever puzzle members of Parliament, or "meddle and muddle" with ships. The education of boys for the sea service has not yet obtained the attention it deserves, and save the exceptional cases of one or two eminent shipowners, and of one or two earnest men attached to seamen's missions, the real wants, the shore wants of seamen are neglected for the more fanciful and more notorious agitations respecting seamen afloat.

It is unnecessary to carry our remarks further. The return seems to us to be a record of vice, dissipation, idleness, ignorance, and roguery, even if presented in the most favourable light for the men; but even then we are happy and proud to say, that so small is the proportion of men included in this return when compared with the great body of seamen, that it leaves a splendid and immense majority whom every Englishman has a right to claim with pride as fellow subjects.

AN INQUIRY REGARDING THE CAUSES OF THE GENERAL CIRCULATION IN THE ATMOSTHERE.

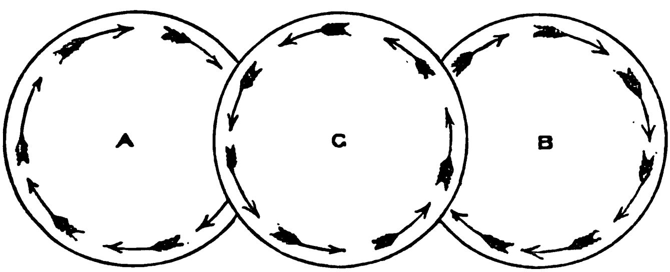
I FEEL much honoured by the notice which Herr Buys Ballot, the distinguished Dutch Meteorologist, has taken of my former article on "Gradients and Currents," and I desire to express my indebtedness to him for the valuable suggestions which he offers for consideration.

In the remarks on circular waves my aim was not to present an exhaustive view of their interactions, but only to indicate and illustrate in a very general manner my conviction that the fundamental element in the varieties of pressure experienced in the atmosphere is the simple wave form with its advancing and receding side, and that it is by the combination of such rotating waves that the resulting depressions or elevations are formed.

Since writing the article the following illustration suggested itself, exhibiting in a simple way the development of a cyclonic movement between two rotating waves.

If A and B, representing two hemispheres impinging upon a central one C, having its flat side uppermost, be made to rotate

FIG. 1.



with watch hands, the central C partaking of their movement will rotate in the reverse direction.

A depression being a negative quantity and a wave a positive

à priori, one would imagine the latter a more instructive study than the former. However, I quite agree with the opinion that neither should be neglected, and that the greatest advance may be expected to be made by considering both, and their relations to each other. I hope (with the Editor's kind permission), when I come to consider the formation of these local gradients, to offer a few practical remarks in the lines of inquiry marked out by Herr Buys Ballot. Until we can form some notion of the influences to which these waves are subjected, we can hardly reason with accuracy regarding their movement, even with the aid of the most carefully constructed charts, for under a present influence they may be proceeding in a certain direction, and again in a few hours receiving a new impulse, their form and direction may be completely modified. An attempt is made in the Table of Currents to point out the times and nature of these influences, and in treating of local differences of pressure it will be my endeavour to state the principles upon which it is constructed.

Astronomers are well aware of the value of knowing the best times and places for making their observations, and it is hardly necessary to urge on meteorologists the importance of being acquainted, even approximately, with the time and character of an impending change; as by repeated observation its real nature may be ascertained.

With regard to the extension of the Table it should, I think, pretty nearly suffice for any place in the north temperate zone, reckoning the time at such place by the sun, and making a slight allowance for variation of latitude. In the extreme north, east should be substituted for west in the columns headed "General Direction" and "Force."

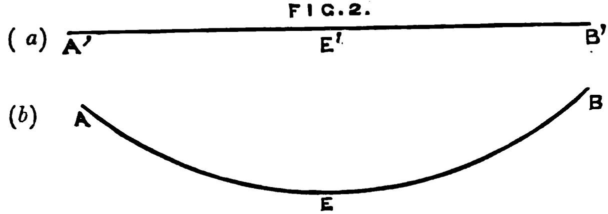
But as in my opinion the key to the local circulation as distinguished from the general is to be found in the latter, it is necessary in the first place to examine the causes which effect it, eliminating as far as possible the local irregularities with which it is overlaid.

In the former article we saw that to produce the trade winds there must be two great gradients within the tropics, having their lowest parts near the equator, and their highest in the belts of calms

and variables to the north and south respectively. This theoretical deduction is verified by the results of observation, which show that the mean of the barometer is higher at the tropics than at the equator; in other words, there is an almost constant deficiency of pressure in the equatorial regions.

Fig. 2 (*b*) gives a representation of a vertical section of these two gradients. A and B representing regions of higher barometer

FIG. 2.



north and south of E, the equator a region of lower barometer, A E being the gradient for north-easterly winds, and B E for south-easterly.

If, for the sake of illustration, we suppose (Fig. 2, *a*) the barometer to stand at a uniform height within the region in question, then to produce these gradients the barometer must fall at E′. A depression being formed there, a motion of the air from A and B will take place towards it, causing the barometer to rise at A and B, both actions producing the same result. It will be seen further on, that this depression is followed by a compression, as it may be called, which will have the effect of causing the barometer to rise at E, and that again will cause a fall at A and B. This will render the gradients less steep. But this compression being succeeded by another depression, the same variation will again occur.

Whatever difference of opinion there may be as to the causes at work, it may be safely asserted that there is none as to the region in which they are most effectively in operation, and that is in the equatorial regions. We are thus driven to the conclusion that these gradients are mainly due to a fall of the barometer or the formation of a depression in the vicinity of the equator.

That the general circulation is owing to a depression, followed

by a compression moving from east to west, may be shown thus:—

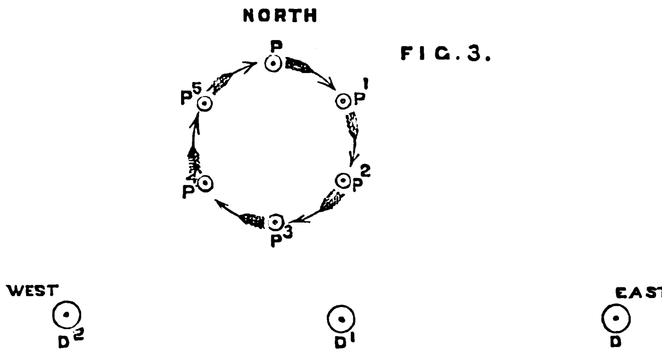


FIG. 3.

Let P (Fig. 3) represent a particle or body of air moving towards the centre of a depression D—the barometer being higher at P than at D. When the particle has reached the position P^1 the depression moving towards the west is now at D^1, and the particle will therefore move towards it into the position P^2, but the depression being now at D^2, the particle will move to P^3; in plain terms, the motion of the depression will cause the body of air to describe a semicircle—moving from west through north to east.

The compression by which, according to the law of inertia, this depression must be followed, will complete the circulation of the body of air P. For if we consider that while the particle is in the position P^3 the following compression is in the position D, the barometer being now higher at D than at P^3 the particle will move into the position P^4. As the compression proceeds westwards to D^1 and D^2 the particle will move towards P^5 and at last regain P, its original position. In short it will describe a semicircle moving from east through south to west.

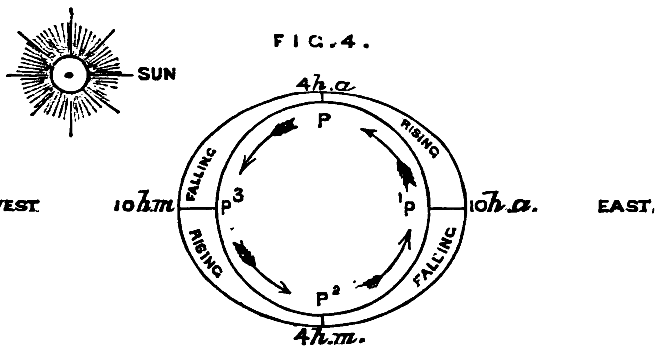
In a similar manner it might be easily shown that a depression moving westwards, followed by a compression, will cause the air south of the equator to rotate in the reverse direction.

This result is in strict agreement with what was observed in the experiment with the water in the basin—the circulation being clearly the effect of a hollow, followed by an elevation.

It may now be naturally asked, is this experimental and theoretical

deduction confirmed by known facts? and it may be confidently affirmed that it is. Within the tropics, and especially near the equator, the barometer rises and falls with so much regularity, that it has been said "that the hour of the day may be inferred from its height." It rises from about 4 h.m. to 10 h.m.; falls from 10 h.m. to 4 h.a; rises again from 4 h.a. to 10 h.a.; and falls from 10 h.a. till 4 h.m. These changes are graphically represented in Figure 4.

FIG. 4.



The circle, P, P[1], P[2], P[3], represents a vertical section of the earth at the equator, and the surrounding elliptical envelope the atmosphere. The arrows show the direction in which the wave form is moving. There are two depressions, and two compressions, and four sections, in which the barometer is either rising or falling, according as the waves are advancing or receding.

It is worthy of notice that the sun is followed by a depression, and not by a compression—thus showing that its effect on the atmosphere is to produce the former.

The greater depression reaches its minimum about 4 h.a., followed by the greater compression, which attains its maximum about 10 h.a.

We have now seen by theory, experiment, and observation, that the general circulation is caused by a depression, followed by a compression moving westwards; and that these are found succeeding each other with great regularity within the tropics.

We are now, therefore, face to face with the inquiry, What is the origin of this depression? The following compression and the succeeding smaller and secondary depression and compression

need not at present engage our attention, as they could easily be shown to result from the primary.

As we have found that this depression follows the apparent diurnal revolution of the sun from east to west, we naturally turn our eyes to that luminary as the exciting cause, and to the rotation of the earth as originating its westward motion. This being so, we are led to ask, How does the sun cause the barometer to fall?

The sun is the acknowledged centre of the two great forces, heat and attraction; to which of these therefore must we look as the agent in effecting this depression, and first of all let us examine the agency of heat.

The action of heat as an agent in altering the pressure of the atmosphere has been proved to be almost, if not altogether, inappreciable by Sir John Herschel in his work on Meteorology. One or two remarks may, however, not be out of place. It is well known that, even within the tropics where the heat is most intense, the temperature of the higher regions of the atmosphere is below the freezing point. The heat must, therefore, chiefly affect the lower strata of the air. The particles of air in immediate contact with the earth becoming heated, give place to colder ones which descend, and are heated in their turn, and this operation goes on without disturbing the equilibrium of the atmosphere, or altering its pressure, very much in the same manner as the particles of water are observed to do in the common experiment of heating water containing oak sawdust in mechanical mixture. To produce the necessary dynamical effect, the air would require to expand in very large volumes, and that might be the case if it were heated directly by the rays of the sun. No doubt air, when confined in a vessel, expands with considerable force, but in the atmosphere the particles are perfectly free to move in any direction. Indeed, the extreme mobility of the air is one of its most striking characteristics. A simple experiment may serve to illustrate the action of heat. If a flask (containing air) be fastened to the open end of the tube of a siphon barometer, so that the outer air is completely excluded, it will be found that the barometrical pressure remains very nearly constant for all ordinary temperatures. If the heat applied be considerable, the mercury may rise, but no ordinary

degree of cold will have the least effect. That is to say, we may increase the original pressure by adding heat, but cannot diminish it by withdrawing heat. The action of heat then, if appreciable, must cause a rise in the barometer—an effect contrary to that observed.

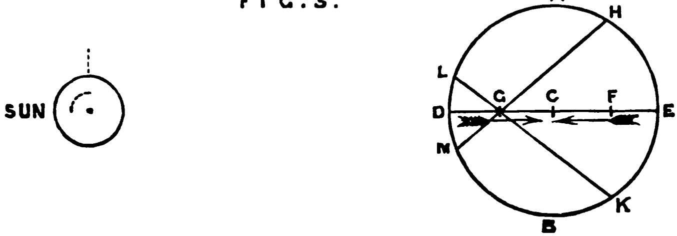
As the intensity of gravity varies at different places on the earth's surface, this apparatus suggests itself as a measurer of that intensity.

Having now seen that heat is ineffectual in producing the depression, we may turn to consider the effect of attraction. Sir John Herschel, in the work before referred to, points out vapour tension as the probable effective cause, but I venture to express the opinion that it seems to be wanting in these elements of regularity in its action required by the conditions, and I am the more convinced of its inadequacy, as I hope presently to be able to show that attraction explains clearly and fully all the phenomena.

Attraction may be defined as that mutual force which bodies exert, by reason of which they have a tendency to move towards each other. As all bodies near the surface of the earth tend to move or gravitate, as it as been called, towards the centre, the attractions must meet and neutralize each other there. The tendency towards the centre must, therefore, be greatest at the surface and diminish towards the centre, and the sum of the tendencies being all towards the centre, the particles there must be in a high state of compression, so that the centre of the earth must be the densest part, gradually diminishing in density towards the surface. This agrees with observed facts, as the average density of the bodies near the surface is found to be much less than the mean density of the earth.

These considerations and others may be proved in the following manner.

FIG. 5.



A B D E (Fig. 5) represents the earth, C the centre, D E a diameter, and D, G, C, F and E particles of matter in D E.

The particle D is attracted by all the particles in the line D E, and therefore has a strong tendency to move towards E. Again, the particle E is attracted by all the particles in the line E D, and has, therefore, a strong tendency to move towards D. The particle C, being equally attracted on all sides, will have no tendency to move in any direction.

In D E take any particle as G. Then G is attracted towards E by all the particles in the line G E, and towards D by the particles in G D; but as G E is greater than G D, the resultant tendency of G is towards E; or if we take other lines of attraction, as L G K and M G H, it is obvious that the resultant tendency is still towards E.

In the same manner it might be shown that all the particles from D to C have a tendency to move towards E; that tendency being strongest at D, and diminishing towards C, the centre, where it vanishes.

By taking a point, F in C E, it may be similarly proved that all the particles in C E have a tendency to move towards D, the polarity being greatest at E, and diminishing towards C.

This proceeds on the assumption that the earth is of equal density throughout, but the actual variation in density will not affect the general argument.

The magnet affords a good illustration, for if we suppose D E to represent a magnet, the polarity is greatest at the poles D and E, and least at C.

Let us now direct our attention to the effect produced by the attraction of the sun upon these tendencies. It is clear (Fig. 5) that it will give all the particles in the line D E a tendency to move towards it; and, as we have seen that the tendency of the particles in C E is in the same, and that of those in D E in the reverse direction, the result will be to make the former tendency greater and the latter less. Now as the tendency of the particles in D C and E C to move towards the centre C produces the attraction of gravity at the surface, it is plain that the resultant effect of the attraction of the sun is to lessen the attraction of

gravity on that side of the earth immediately underneath it, and to increase that attraction on the further side, so that bodies on or near the surface at D will be made specifically lighter, while those at E will be made specifically heavier. But as D is nearer the sun than E the effect will be proportionally greater at the former than at the latter.

From this it follows that the effect of the sun's attraction is to cause a decrease of pressure in the atmosphere immediately underneath it, and an increase in pressure on the further side of the globe, although in a less degree. This might, I think, be experimentally verified within the tropics by means of the apparatus alluded to above, as capable of being used as a measurer of the varying intensity of gravity, making the vessel containing air as large as possible, and correcting it for the action of heat.

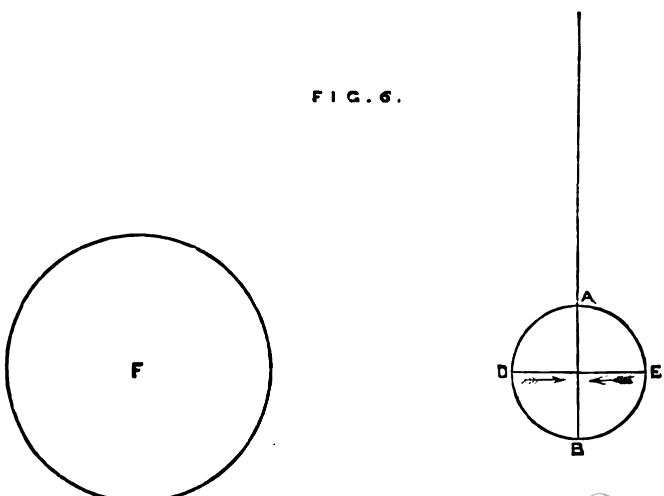
It is thus, I think, conclusively proved that the depression or fall of the barometer observable within the tropics is due to the sun's attractive force.

It need hardly be pointed out that its main effect on the atmosphere is not immediate, but mediately through the earth.

The sun's direct attraction on the air will obviously act in the same manner, but its effect I should suppose will be very slight.

Electricity also affords a good illustration of this principle thus: Fig. 6.

FIG. 6.

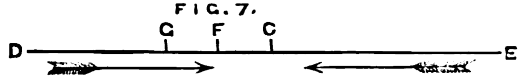


If we suppose an electrified body F attracting an unelectrified body A B D E, the latter moves towards the former.

As we have already seen, the effect of the attraction of F upon A B D E is to increase the tendency of the particles in the hemisphere A E B to move towards it, and to diminish the tendency of those in A D B to move away from it, the resultant tendency is to move towards it.

For to give a further illustration (Fig. 7), if we suppose two equal and opposite forces, D C and E C acting on C, it will remain at rest; but if we make the force D C less by F C, and E C greater by F G, it is plain that C will move to G, the resultant being the sum of the two additional forces. In other words, if we subtract a quantity from one side of an equation, and add a quantity to the other side, the result would be the same if we added the sum of the quantities to one side, or subtracted their sum from the other.

FIG. 7.



In Fig. 6, according to the language employed by electricians, the body A B D E is negatively electrified on the side next F, and positively on the further side. Employing the same terms, we may say that the sun is an electrified body producing negative electricity on that side of the globe next it, and positive on the further side, the result being to cause the earth to move towards it.

The attractions and repulsions of electricity and magnetism may thus be considered only special cases of the simple law of attraction.

In consideration of the great importance and far-reaching character of this principle, which I think can hardly be over-estimated, I may be pardoned if in a word or two I attempt to indicate a number of phenomena on which it throws a flood of light.

The currents and tides of the ocean are explicable from the same cause—the water under the sun being specifically lighter, a depression, if we may so call it, followed by an elevation, produces the circulation which a glance at a physical chart of the globe will show to be similar to that already pointed out as obtaining in the atmosphere.

Earthquakes are also referable to the depression caused by the

sun, and to the effort made by the strata north and south to restore the equilibrium.

The geological distribution of the strata may be attributed to the same cause, also the absence of any atmosphere on the side of the moon next the earth and the abundant traces of volcanic action observable on its surface.

Sun spots may probably be cyclones secondary to depressions formed by the planets in the sun's equatorial regions.

Indeed the immense number of natural phenomena which it seems satisfactorily to explain is a fourth proof, if any were needed, of its truth.

I have not considered the moon's attraction, but it is obvious that the reasoning equally applies to it. The table of currents is mainly based upon the movements of the moon.

We have now seen that all the motions of the atmosphere are mainly caused by two depressions, one formed by the sun and the other by the moon, and as the sun is more persistent in its action than the moon, I believe the general circulation is mainly due to it and the local differences to the moon, for the latter goes through all the changes in each month of 27⅓ days which the former only undergoes once a year.

Starting from the fundamental principles of the gradient and the deviation of the wind, we have learned

1st. That the great gradients are formed by a depression due to the attractive force of the sun.

2nd. That these gradients have a rotatory motion owing to the movement of that depression westwards.

3rd. That they have a progressive motion north and south following the varying declination of the sun; and,

4th. That they have an oscillating movement advancing towards the depression and receding from the following compression.

The depression formed by the moon will also produce similar gradients, with rotatory, progressive and oscillating movements.

Perhaps I should not conclude this paper without noticing briefly the explanation usually given of the deviation of the trade winds. This is ascribed to the varying rotational velocity of different places on the earth's surface: for example, while bodies on the equator

are whirled round at the rate of about one thousand miles an hour, those north and south are carried round at a slower rate—the speed gradually diminishing towards the poles. A north wind setting towards the equator is therefore continually passing over places which have a higher rotational velocity than the region in which it originated, and it is thus supposed to lag behind and, gradually deviating to the right, become the north-east trade wind. One or two considerations will, I imagine, suffice to show that this position is untenable. The difference between the rotational velocity at the equator and that at 20° N. lat. may be stated roughly at 50 miles per hour, and the average deviation within the tropics at $2\frac{1}{2}$ miles per degree or 65 yards a mile per hour. Is it conceivable that this will have any appreciable effect in producing the deviation of the trade wind? Besides the atmosphere partaking of the increasing velocity of the earth's surface will naturally act upon the wind and communicate that velocity to it. This action of the surrounding atmosphere upon the current of air is too often overlooked in making the explanation. Like a well-constructed ship, which responds with unerring precision to the slightest motion of the helm, the wind obeys every impulse which it receives.

D. D.

THE TERMS "PORT" AND "STARBOARD."

MR. VYVYAN, of the Emigration Office at Liverpool, has, in a small pamphlet recently published,* drawn attention to the use of the terms "port" and "starboard," as applied to the helm, with a view to their abolition amongst seafaring men, and the substitution of the terms "right" and "left" in their stead. As several circumstances have combined to bring such an idea into prominence, and as Mr. Vyvyan is well qualified to form and express opinions on the subject, we propose to devote a few pages to an examination of the whole question, which, if we are not mistaken, involves very grave issues, and deserves very careful handling.

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* See *Nautical Magazine*, 1878 (Vol. 47), page 938.

That there is amongst us a strong feeling that in cases of collision, and of other accidents in narrow waters, wrong helm is often to blame, cannot be denied. It is certain also that a large number of seamen believe that this wrong helm is often given in consequence of the misinterpretation of the order by the helmsmen, and sometimes from the mistaken expressions of the person in command. The belief has found authoritative expression through the Committee which recently sat at the Board of Trade to revise the steering and sailing rules. The Committee propose to strike out the words "shall port her helm," and to insert instead the words "shall alter her course to starboard," in what is the present Article 13. Again, in the clause adopting a system of sound helm signals for steamers, they propose to substitute the words, "I am directing my course to starboard" (or, to port), for the words "I am about to port (or to starboard) my helm." In making these important changes they remark, "the words 'port helm' are omitted in this and subsequent articles. However well understood by English sailors, they are derived from the movements of a tiller, and are not applicable to the modes of steering now in use. Nor are they used by other nations."

Those who, like Mr. Vyvyan, object to the orders to "port" or to "starboard" as now given on board ships, will no doubt claim this action of the Committee as a help to their side of the argument. But we think that there is some difference between the two things. The Committee, in saying that the term "port helm" is not used by other nations, probably mean that it is not used in their rendering of the steering and sailing rules; because it would hardly be correct to speak thus of the general use of the terms port and starboard as applied to the helm. To go no further than France we have the familiar expressions "mettre la barre à bâbord" or "à tribord," and in other languages there are similar expressions. We can readily see, on a little reflection, that it does not follow because we can expunge the words "port," or "starboard, helm" from the steering and sailing rules that we are, therefore, on the high road to abolish the orders "port the helm," or "starboard the helm." To give an illustration, it may be mentioned that in H.M. Navy, the terms "port helm" and "starboard helm" have

been eliminated from all the signals ordering tactical movements, and the words "turn to starboard" or "turn to port" have been for the last ten years used instead. But yet the *orders* "port" and "starboard" as applied to the helm, remain just as before. The officer in command now receives a signal to "turn to starboard," but he gives the order "port the helm" by word of mouth. The reason is obvious: the signal speaks of the movement of the ship, while the verbal order speaks of the process, and the instrument, by which that movement is effected.

So that we may expunge all reference to the helm or rudder in every case where we refer to the movement of the ship, without being one whit nearer a change in the orders used afloat. We must have for our use two sets of expressions; one relating to the helm, or rudder, and the other relating to its effect on the ship. The necessity is absolute, because the ship sometimes fails to obey, and sometimes disobeys, the motion of her helm, and we must have language suitable for expressing these differences.

There is a good deal more of the subtle, and the abstruse, about this question, than we are commonly aware of. "port" and "starboard" represent alternative and opposite ideas, and belong to a class of terms which carry opportunities of error about with them, which are inseparable from the ideas, and which no change in the terms will destroy. To the same class belong the terms, "left" and "right," in relation to the banks of a river. "Left-handed" and "right-handed," as applied to a twist, and other terms of like nature. Few persons, unfamiliar with the use of the terms "right" and "left" banks of a river, can get the ideas the terms are intended to convey without an effort of imagination. You must imagine yourself standing with your back to the source before the terms have any meaning whatever to you. So with a twist: if we look into the bore of a rifled gun, and are told that the rifling has "a right-handed or a left-handed twist" the expression will be meaningless to us, unless we comprehend that we must think only of the upper part of the bore, and close our minds to the lower part altogether. If we do otherwise, there is no meaning for us in the words we hear; for the grooving passes in the upper part of the bore, in exactly the opposite direction to what it does

in the lower part. In the case of revolving storms, there would have been considerable difficulty in describing the differing nature of their rotation, had it not been for the familiar idea of the hands of a watch. When we are told that in the northern hemisphere the storm rotates in a direction opposite to that of the hands of a watch, the simile is so familiar to us that no effort is required to understand the language.

So, as we are all agreed, the terms "port" and "starboard," as used in a ship steered by a tiller, are clear and distinct. The "helm" or tiller is then in our hands and under our eyes, and we put it to the port or to the starboard side of the ship, without confusion or error. But to a man from whose eyes the tiller has always been hidden, and to whom the word "helm" does not at once convey the mental image of a tiller, the words "port the helm" must be referred to something else visible and familiar. And then comes the difficulty. The two things most impressed upon him are the motion of the wheel and the motion of the ship's head. The actual movement of the ship through the water—the "turn," as though round a corner—is not familiar to him, but he knows that the motion of the upper spokes of the wheel travel from port to starboard, and so far resemble the motion of the ship's head.

But both these motions are opposite to that of the helm, and if he has no tiller in his mind's eye, the motions of the upper spokes of the wheel and of the ship's head in a manner contradict the orders which cause those motions. Hence he gets an uncertainty in his mind, because the order to "port" more naturally connects itself with motions from starboard to port, than from port to starboard. But just as he neglects in his thoughts the motion of the lower spokes of the wheel, so does he neglect in his thoughts the motion *from* one side ; he only regards the motion *to* one side, and if we could reverse the usual way of looking at things, a motion *from* port to starboard would as naturally connect itself with the word "port," as it now rebels against that connection.

In a similar manner we can trace other sources of error. A man accustomed to stand on the starboard side of the wheel is accustomed, when he gets an order to "port," to draw the spokes

towards him. If we put him to the left of the wheel, while he has in his mind this idea of drawing the spokes towards him on receiving an order to "port," he will most naturally draw the spokes towards him again on receiving the same order. In fact, our experience often shows us these effects, as we see that even a good helmsman will now and then move the wheel two or three spokes the wrong way before sufficient recollection comes to his aid. In that moment he has exerted his imagination, and has referred the order he has received to its proper connecting object. He has either thought of the tiller out of sight below him, or of the motion of the upper spokes of the wheel in reference either to the side of the ship, or to the side on which he has been accustomed to stand.

Thus we see, that whatever terms we use to denote the two opposite positions or motions of the instrument employed to turn the ship, these terms must be connected with some particular part of the instrument to the total exclusion of every other part, otherwise there will be certainly as much confusion as at present.

Mr. Vyvyan proposes, as we have said, to substitute the terms "right" and "left" for the terms "starboard" and "port." That is, we are to say "right" where we now say "port," and "left" where we now say "starboard." A successful introduction of these terms would clearly depend upon totally disconnecting them from the "helm," or tiller. This would probably be next to impossible in ships steered by a tiller, but it might be possible where the tiller is concealed from view; for stress might then be laid on the fact that the upper spokes of the wheel, the rudder, and the ship's head, would all move to the right when the order "right" was given, and would all move to the left when the order "left" was given.

But then we must recollect how ingrained this reference to the tiller is in nautical language. True that when we "right" or "steady" the helm, we right or steady also the rudder and the course of the ship. But we carry lee or weather "helm" according as the tiller is towards the lee or the weather side; we put the "helm" a-lee or a-weather; we put the "helm" down or up, and so on. If we now say that a ship carries "port" or

"starboard helm," we have to consider whether we could say with equal clearness that she carries "right" or "left helm," and it is evident that we could not, for this brings in the very reference to the tiller which it is our object to abolish. It might be possible to speak of a right or left "rudder" without immediate confusion, though any reference to what is not seen must tend to bring in all the present troubles. We might possibly speak of a right or left "wheel," meaning that the midship spoke had moved to the right or left of its proper place; but, after all, we see that if any, or all of these arrangements could be made, we should always be liable to nearly the same difficulties and doubts as at present.

We may think that all is clear because the motions of the rudder, upper spokes of wheel, and ship's head correspond to the terms used. But it is manifest that they only correspond so long as we all agree to ignore the motion *from*, and to think only of the motion *towards*. If circumstances brought the motion *from* into prominence, that alone would make a confusion quite as great as any that we have at present.

And in the very cases where the shoe most pinches now, we appear to have just the prominence given to motions *from*, which we speak of. In approaching towards collision, or in taking steps to avoid it, we have a connection between the tiller and the word of command which would be lost under other conditions. If a man sees a red light a very little on his *port* bow, his present order is "port," and his head turns *from* the port or red light. If, on the other hand, a green light is very little on his starboard bow, his order is "starboard," and he turns *from* the starboard or green light. In these cases, with the substituted words and ideas, "right" would mean "turn from the left," and "left," "turn from the right." There are no such confusions now; and it may be fairly argued that the confusion described is remote. But it is hardly more remote than that now asserted to arise between the opposite motions of the tiller and the rudder.

There are still some curious thoughts in relation to this subject which deserve a place. "Starboard" is connected with odd numbers, and "port" with even numbers. Thus the ship on the starboard tack is to denote the fact by a single sound, while the

ship on the port tack is to denote it by a double sound. So, also, in the new scheme, the steamer is to sound a single blast when directing her course to starboard, and a double blast when directing her course to port. Between the nature of the signals denoting the tack and the helm there is no confusion, provided we can steadily keep the tiller out of our minds. But if we give the order "port the helm," the established connection between the even number and the word "port" will tend to make us, on an emergency, and without clear reflection, make a double-blast signal when we should use a single blast.

If the use of the terms "right" and "left," or any other proposed terms, would rid us of all ideas connected with the tiller, or the "helm," the above sources of error would disappear. But the question really is, whether any words will effect this object. Of the terms "right" and "left" as substitutes for "port" and "starboard," we may observe that they must become verbs and adjectives. We must be able to speak of an order "to left," as a substitute for an order "to starboard," and of an order "to right" as a substitute for an order "to port." Here we observe we are forestalled, because "to right" already has a special meaning, namely, to "put the helm amidships." Again, we must be prepared to speak of a "right" rudder, or wheel, and a "left" rudder, or wheel, just as we now speak of a port or starboard helm, as we have already observed; and the question is, whether any terms are really available for our use under these circumstances.

Suppose, again, that we had adopted the word "right" to denote port helm, and "left" to denote starboard helm, we should lose a connection between the coloured lights and the terms now employed, which might in cases be undesirable. We can hardly hope to get rid of the connection between the words "right" and "starboard," and "left" and "port." In approaches towards collision the orders "starboard—show him our green light," or "port—show him our red light," are utterances of course. If the terms were altered as proposed, we should find ourselves saying "left—show him our green light," and "right—show him our red light." But as the commander's attention would be concentrated on his right side light when he said "left," and on

his left light when he said "right," we can readily imagine the wrong word springing unbidden to his lips.

We have not attempted to steer a clear course through all these difficulties. Most of those who advocate a change are well worthy of being listened to, and if a change is necessary, and can be made satisfactorily, simple objection to change will but prevent it. We have ventured, however, to point out some of the difficulties which lie in the way of change, even when the change on the surface appears to be very insignificant. The fact is, that nothing connected with the motion of a ship's helm is insignificant. It can but move to the right or left, but in the one case we get safety, and in the other destruction. As destruction, therefore, is always impending upon a simple substitution of one word for another, we cannot be too close critics of any proposals based upon these two words.

INQUIRIES INTO WRECKS.

ENGLISH AND GERMAN.

WE have in a previous article referred to the new German law establishing courts of inquiry into wrecks and casualties; and we are asked to refer to the subject again, now that the British shipping interests are obtaining an insight into it through investigations which have been recently held under it into casualties to British ships. We cannot do better towards effecting an elucidation of the subject, than by comparing the English legislative enactments and supplementary rules with the German law, and in doing so pointing out as well as we are able in this early stage, the resemblances and differences between the two systems, and inquire how, if at all, the British shipowner and shipmaster are affected thereby.

We will begin with the English law. There are under the

English law and in the United Kingdom two sorts of inquiry in the case of casualties to British merchant ships:—

(*a.*) The inquiry instituted by receivers of wreck, which we may call the initial inquiry;

(*b.*) The inquiry before a Wreck Court, consisting of the Wreck Commissioner, or a stipendiary magistrate, or two justices of the peace, always with the assistance of assessors. This we call the official inquiry.

The initial inquiry is instituted as a matter of course by the Receiver of Wreck, by virtue of his office, and without instruction, and it is held in the following cases. We are now only speaking of casualties to *British* ships:—

(*a.*) Whenever a ship is stranded or damaged anywhere, and any witness is found in the United Kingdom;

(*b.*) Whenever a ship is lost or is supposed to have been lost anywhere, and any evidence can be obtained in the United Kingdom as to the circumstances under which she proceeded to sea or was last heard of.

The Receiver's report is sent to the Board of Trade. The Board can, and, judging from the evidence given before the Royal Commission by Mr. Farrer and Mr. Gray, we believe do, order the second or official inquiry whenever they think the circumstances as disclosed in the report of the initial inquiry warrant or require it.

As regards inquiries elsewhere than in the United Kingdom (we are now again referring only to wrecks and casualties to British ships), very nearly the same process of initial inquiry is in force, and the same results as regards official inquiries are attained in the colonies and other parts of our empire abroad, and in foreign countries, by means of colonial officers, and consuls, and naval courts; so that as regards British ships known to have met with loss or casualty anywhere, there is, or at all events can be, by means of the officers and courts established in the United Kingdom and all over the world by the English Legislature, ample inquiry to serve the requirements of all "British interests."

As regards inquiries into wrecks and casualties to foreign ships,

the following are the facts of the case. We must beg our readers, for the sake of clearness, to bear distinctly in mind that whereas in the former paragraphs we have referred to wrecks and casualties to *British* ships everywhere, we are now about to write only of wrecks and casualties to foreign ships on and near the coasts of the United Kingdom. Inquiries into foreign ships can be legally held (we use the word "legally" to distinguish the right to hold the inquiry from the practice of only holding it in some cases) in the United Kingdom, as follows:—

(*a.*) The initial inquiry can be held here whenever a foreign ship has been stranded or damaged on or near the coasts of the United Kingdom, and any witness is found at any place in the United Kingdom.*

(*b.*) The official inquiry can be held in the like cases.

Practically, and as far as we know, with two or at most three exceptions only (we know the cases of the *Schiller* and the *Deutschland*), an official inquiry into a casualty to a foreign ship on or near the coasts of the United Kingdom, has never been held by a British Court of Inquiry.

The above in general terms, and we think also in detail, is as much as need be at present stated, as regards the inquiries in the United Kingdom.

We now turn to Germany. The law of Germany is found in the *German Gazette*, No. 33, and is dated 27th July, 1877, and the following is a free rendering of the substance of its leading provisions:—Courts, called Sea Courts, have been established at the ports, and at various places on the coasts of Germany, and these Courts are empowered to institute inquiry; not like the *initial* inquiry by a Receiver in the United Kingdom, but very like the *official* inquiry of the Wreck Commissioner. Inquiry *may*, under the Act, be instituted into

(1.) Wrecks and casualties to German merchant ships, wherever the wreck or casualty may happen; and

* [This is equally true of casualties to foreign ships within the waters of British possessions abroad.—Ed.]

(2.) Wrecks and casualties to British ships—

(*a*.) In cases where the casualty happens on or near the coasts of Germany; and also

(*b*.) In any case in which the Chancellor of the Empire so orders.

Further, as regards the cases in which the Court may or may not use discretion as to whether it will or will not hold inquiry, the law expressly states that the Court *shall* have no option but *shall* hold inquiry—

Whenever loss of life happens, and whenever a ship has been lost or is abandoned, and whenever the Chancellor orders inquiry.

In other cases the Court may, as it pleases itself, hold or not hold an inquiry.

The British shipowner and shipmaster are open to the following course of inquiry if their ship happens to meet with a casualty in German waters, viz.:—

1. To an initial inquiry held by the British Consul: *
2. To an official inquiry held by a naval court, summoned by the British Consul.*
3. To an inquiry held by the German Sea Court.†
4. To an inquiry held on appeal to the Court of Appeal from the Sea Court.

The British shipmaster in Germany may not have the British Consul as a representative in the German Court; but may engage the services of a lawyer to defend him, and to examine witnesses and make statements on his behalf.

Besides all the above, in the case of a British ship meeting with a casualty in German waters, as well as in the case in which she

* [The inquiries, 1 and 2, may lead to the cancellation or suspension of the certificate of any certificated officer; and the report of the Court may throw blame on the owners, shippers, builders, &c., or their agents.—Ed.]

† [This Court cannot interfere with the certificates of any British officers, but may find the masters and crew guilty of civil or criminal offences, and may find the owners, &c., morally and civilly responsible, and in the case of collision may condemn the British ship as in fault.—Ed.]

meets with a casualty elsewhere and the Chancellor orders inquiry, the British shipowner may be subject to a suit in the German law courts for any infringement of German law or regulation, to criminal liability under the German law if the Court of Appeal from the Sea Court find that life is lost in the British ship or caused by the British ship, through the fault of the master, officers, or crew, or of anybody on board the ship while within German jurisdiction; and last, but not least, a trial in the Wreck Commissioner's Court at home may be in waiting, and will be held in cases in which the German Sea Court and the German Appeal Court have tried the case, for those Courts cannot interfere in any way to cancel or suspend the certificate of any British master or officer, and they must be tried for their certificates somewhere.

The master of a British ship trading to a German port ought hereafter to be well selected and well paid, for the owners will find that any parsimony which may lead them to employ an ill-paid or incompetent master or officer, will land them in expenditure, in the shape of lawyers' and agents' fees and liabilities, and detention monies, and loss of time; in comparison with which a very handsome salary to the master and officers will be an insignificant flea-bite. This note of warning may at first sight appear unnecessary, but it is not, nor is it uncalled for. As our readers are well aware, the German Sea Courts, standing on their law, and asserting in no hesitating or doubtful way their rights of interference with British ships whenever they are once within German jurisdiction, have already proceeded to inquire into casualties to British merchant ships. We cannot but admire the German method, notwithstanding that it will be very hard on British interests. But it is so thorough, and so unflinching. and says to us so plainly and without sentiment or weakness, "if you Britishers or other foreigners choose to send your ships into German waters you will have to do as we Germans do and be treated as we are, so make up your minds for it and come with your eyes open." It is as the spirit of a great people asserting itself in a grand, because plain and clear, way; but would be wretchedly inconvenient to any maritime power whose policy may be at one time not to interfere, and another time to interfere in a half sort of way with its own subjects and with foreigners, and never to

treat both alike; and to claim with one breath the rights of their own law and their own Consular authority wherever their own ships may be, and with the very next breath to ask for the aid of foreign police and foreign prisons to look after merchant seamen.

Now let us see what is the case as regards inquiry with the German merchant ship meeting with a casualty in this country or arriving here after casualty.

If the casualty is on the coast within British territorial jurisdiction, the initial inquiry is held by the Receiver, and nothing more.

If the wreck or casualty is outside British territorial jurisdiction, even the initial inquiry is not held by the English Receiver.

In either or both of the above cases an inquiry is however now to be held in this country by the German consular officer, who forms a Sea Court competent to deal with the certificates of the masters and officers.

The case of British shipmasters in Germany is that they are to be fully dealt with by German law irrespective of the provisions of the Imperial English Acts. Indeed the only difference in the treatment of a German and an English case in Germany is that the certificates of English officers cannot be touched.

The case of German shipmasters in England is that beyond the mere initial inquiry of the Receiver, which is nothing more in form or substance than the writing of a protest, nothing is done by way of inquiry. The British law does not interfere with the foreign ship, though the casualty happen on our coasts, beyond the initial inquiry.

In the case of inquiry by the German Sea Court and Court of Appeal, no one attends on behalf of British interests. Whereas, in the case of a formal inquiry in England, the German Government are first courteously consulted, and permitted to send an officer to watch the case. The printed paper in the case of the *Deutschland* inquiry fully shows this; and by the "rules" the Consul, or any one else, can become a party to the proceedings, and have full rights here.

The German Act instituting Sea Courts is as closely as possible ounded on the English Act, the notable differences however being that the number of Assessors is greater in Germany, that the English Government and its representatives can have no *locus standi*, and that a full and very perfect Court of Appeal is instituted.

OUR MERCANTILE FLEET.

ON the 13th of the last month the First Lord of the Admiralty was asked by Sir E. Watkin whether efficient measures are in preparation whereby the Mercantile Marine of the country may be made available at short notice for the protection of our commerce. From the reply of the First Lord it may be gathered that not only are the Government disposed to utilize our mercantile steam fleet as an armed auxiliary should an emergency arise, but that measures have already been taken for giving effect to this policy—that should the necessity present itself the Government would not hesitate to ask Parliament for the necessary powers—but he did not apprehend that legislation would be necessary. The subject of adopting merchant steamships for war purposes, is not referred to in our columns for the first time. Our number for June last contained an article from the pen of Mr. John Burns, in which the writer brought his extensive knowledge of the management of steamships to bear on the subject. Up to the time at which Mr. Burns entered upon the discussion respecting the arming of merchant steamships the Admiralty had only gone the length of directing surveys of several merchant steamers under the direction of the Department of Naval Construction—the result being that certain steamers were found which, at inconsiderable expense, could be altered and fitted so as to make them eligible to be placed on the Admiralty List. Having found the ships, the next thing the Government had to do was to formulate a plan for arrangement with the owners. That plan does not appear to have been yet matured. Mr. Burns pointed

out that shipowners cannot afford, and it would be unreasonable to ask them, to alter their ships and involve themselves in an outlay of greater or less amount unless there was bonâ fide employment offered. "The Admiralty scheme," said Mr. Burns, in itself appears nebulous, lacking boldness of conception, and a full consideration of the elements necessary for the accomplishment of so great a measure. A satisfactory system could only be matured and carried into effect by suitable arrangements being made with companies owning large fleets of well equipped vessels. These possess facilities bearing upon store accommodation, official discipline among crews, and other important appointments which have been called into existence and established by the necessities attaching to the successful working of extensive business, and to the incidence of its daily governing, all of which facilities and advantages would obviously be invaluable to the nation were they called into requisition by Government in the event of war or other emergency." We do not know whether the "steps" which the First Lord refers to as having been "taken" go beyond the scheme which formed, six months since, the subject of Mr. Burns's just criticism, but it must be apparent to every rational mind that if at any time any portion of our mercantile steam fleet is to be taken up and adapted to the purposes of the national defence, it must be on terms by which the owners will not be actual losers. We can quite understand that, if an emergency of a sudden and imperative nature should arise, threatening the safety of the State, that shipowners, like every other class in the community, might be called upon to make extraordinary sacrifices—and we have no doubt whatever what that response would be. But in the organization of a system of maritime defence, whether for our commerce or our shores, against a possible or approaching state of hostilities, there certainly is no reason why any one branch of the national industry should be selected to bear the burden of such preparations to the exclusion of others equally interested. If the State should require the aid of first-class steamers, convertible to war purposes, that aid we may be sure will not be withheld, but the Government should be prepared with an equivalent that will not leave the

owners losers. Mr. Burns's project was briefly that the Commissioners of the Admiralty should, in the event of war, have the power of purchasing at a valuation all or any of the vessels of the steamship companies adapted to their purpose, or of chartering them for Her Majesty's Government at an agreed rate of hire, with liberty to equip such vessels with suitable armament; the companies to maintain a certain proportion of men, who would be trained to the use of arms, and exercised in gunnery practice in accordance with the regulations of the Royal Naval Reserve. Such a plan as this would have the advantage that in effecting the object aimed at, namely, the organization of an auxiliary maritime force, neither hardship nor injustice would be inflicted. There can be no doubt that there are the materials in the registered steam tonnage of this country for a supplemental organization of this nature, such as no other State can furnish forth. The heavier class of ironclads can never be employed by this or by any other country as sea-going vessels; the protection of colonies and of commerce will be committed to armour-plated frigates, with heavy armaments, and to gunboats; to such a fleet a number of armed steamers would be of the utmost importance and assistance, and would well repay any expense which the State might incur in their hiring and equipment. The students of our maritime history will be at no loss to light on instances where the merchant ships of England have done good service against the enemy. Times have changed, no doubt, and a great revolution has been wrought in the British Mercantile Marine since two of our East Indiamen, engaged in the Indian Ocean, gave a good account of them. But the spirit which prompted that deed of gallantry survives in our seamen and their commanders in both the Royal and the Merchant Services, and whenever the opportunity arrives it will once more be displayed.

WEATHER FORECAST FOR JANUARY, 1879.

THE CURRENTS OR TENDENCY OF THE AIR OVER THE BRITISH ISLANDS FOR THE MONTH OF JANUARY, 1879.

Date.	Duration.	Force from		General Direction from	Duration.	Force from		General Direction from
Jan.		S.	E. or W.			N.	E. or W.	
1	0 h.m. to 6 h.m.	10	7	S.S.W.	6 h.m. to 1 fol. m.	5	3	N.N.W.
2	1 m. „ 8 m.	9	8	S.W.	8 m. „ 1 „	4	4	N.E.
3	1 m. „ 10 m.	8	8	„	10 m. „ 1 „	4	4	„
4	1 m. „ noon	5	11	W.S.W.	Noon „ 2 „	2	5	E.N.E.
5	2 m. „ 2 a.	3	12	W. by S.	2 a. „ 2 „	1	6	E. by N.
6	2 m. „ 4 a.	0	14	W.	4 a. „ 3 „	0	7	E.
7	4 a. „ 4 fol. m.	1	6	E. by S.	3 m. to 4 a.	3	12	W. by N.
8	5 a. „ 4 „	2	5	E.S.E.	4 m. „ 5 a.	5	11	W.N.W.
9	6 a. „ 3 „	3	5	„	4 m. „ 6 a.	6	10	„
10	8 a. „ 3 „	4	3	S.E.	3 m. „ 8 a.	9	7	N.W.
11	9 a. „ 3 „	5	2	S.S.W.	3 m. „ 9 a.	11	5	N.N.W.
12	10 a. „ 4 „	6	1	„	3 m. „ 10 a.	13	3	„
13	11 a. „ 5 „	6	2	„	4 m. „ 11 a.	12	4	„
14	11 a. „ 6 „	6	2	„	5 m. „ 11 a.	12	4	„
15	... ...	...	...	...	6 m. „ midnight	12	3	„
16	0 m. to 7 m.	5	2	S.S.W.	7 m. „ 1 next m.	11	4	N.N.E.
17	1 m. „ 9 m.	4	2	S.W.	9 m. „ 2 „	9	5	N.E.
18	2 m. „ noon	3	4	W.S.W.	Noon „ 2 „	6	8	E.N.E.
19	2 m. „ 2 a.	1	6	W. by S.	2 a. „ 2 „	2	12	E. by N.
20	2 a. to 4 fol. m.	1	14	E.	2 m. „ 2 a.	0	7	W.
21	4 a. „ 3 „	5	10	E.S.E.	4 m. „ 4 a.	2	5	W.N.W.
22	6 a. „ 2 „	7	9	S.E.	3 m. „ 6 a.	3	4	N.W.
23	7 a. „ 2 „	9	8	„	2 m. „ 7 a.	4	4	„
24	8 a. „ 2 „	11	6	S.S.W.	2 m. „ 8 a.	5	3	N.N.W.
25	8 a. „ 2 „	11	7	„	2 m. „ 8 a.	5	3	„
26	9 a. „ 3 „	11	7	„	2 m. „ 9 a.	5	3	„
27	10 a. „ 4 „	11	7	„	3 m. „ 10 a.	5	3	„
28	11 a. „ 5 „	10	8	S.W.	4 m. „ 11 a.	5	4	N.W.
29	11 a. „ 6 „	9	8	„	5 m. „ 11 a.	4	4	„
30	11 a. „ 8 „	8	9	„	6 m. „ 11 a.	4	4	„
31	... ...	...	...	...	8 m. „ midnight.	3	5	W.N.W.

NOTE.—An E. by Southerly current due to the sun North of parallel of 50° N. Lat. A W. by Southerly current due to the sun South of parallel of 50° N. Lat.

REMARKS.

1. The Table indicates

Strong Southerly tendency from the 1st to the 3rd.
„ Westerly „ „ 3rd „ 10th.
„ Northerly „ „ 10th „ 18th.
„ Easterly „ „ 18th „ 23rd.
„ Southerly „ „ 23rd „ 31st.

2. As in November and December the strongest tendency being from the North produced the heaviest gales from the East, so in January the strongest tendency being from the south will probably cause the heaviest gales to come from the West, and these will likely occur about the times for strong Westerly tendency—that is to say, the most serious and extensive storms are more likely to take place at these than at other times during the month.

3. When there are two currents, their direction may be readily found from the Table given last month: for example, if the wind oscillates between S.W. and N.W. with a rising and falling barometer, these changes indicate a S.Westerly current modified by a N.Westerly one. Again, with a rising and falling barometer, and wind oscillating between N. and E., the currents are Northerly and Easterly. A calm, with a rising or falling barometer, shows two opposite currents, one of which will probably be that stated in Forecast, the other from the opposite point of the compass. The barometer rises highest when the two opposite currents are S.Westerly and N.Easterly. Heaviest rain or snow probable during S.Westerly tendency with wind in the N.E., and during N.Westerly with wind in the S.E.

4. The Forecast may be approximately sufficient for any place in the North Temperate Zone, reckoning time by the sun, and allowing from one to two hours for variation of latitude. In the extreme North E. should probably be substituted for W. in the columns headed "Force" and "General Direction."

D. D.

A VIRTUOUS PROTEST.

WE have received a copy of a placard in very large type bearing the names of no less than twenty-four seamen's boarding-house keepers. We are told on authority that "there is joy in Heaven over one sinner that repenteth rather than over ninety and nine just persons that need no repentance." As regards Cardiff, with which we are better acquainted, we should think that at the present moment joy on the Bench must be unparalleled now that twenty-four seamen's boarding-house keepers are moved to placard the walls with a protest against the love of lucre of the joint fraternity. But we will let these righteous men speak for themselves. They say, "Whereas it has been discovered that of late certain shipping masters in this port have been charging the enormous sum of one pound and one shilling for the shipping of seamen, whether the

ship be bound for the Continent or a long voyage, whether around Cape Horn or the Cape of Good Hope. We, therefore, the principal boarding-house keepers, &c., of this port, with the assistance of the Superintendent of the Sailors' Home,* do pledge ourselves not to supply such persons with seamen for whatever capacity they may be required until they reduce their scale of charges from one pound one shilling to ten shillings and sixpence." Here follow the signatures.

This placard throws a very interesting light on the doings of those who deal in British mercantile seamen. It seems that at Cardiff the boarding masters, &c., are the wholesale dealers, proprietors at first hand, of the body and bones of Jack, which they sell to persons, or as they put it, "supply persons with," whenever the price to be got suits the state of the market. They seem to regard their stock in the same light as do holders of human beings in Dahomey, disposing of them wholesale to the shipping masters (the retail dealers) at so much a head, or so much per batch, as assorted, a reduction on taking a quantity. The retail dealer or shipping master, having bought his seamen wholesale, sells them to the shipowner's agent at twenty-one shillings per head retail. We shall soon expect to see in Cardiff such an announcement as the following:—"Seamen, wholesale—kept in soak and carted to shipping masters with dummy kits; price, natives, one hundred shillings the dozen." And in the retail market the following:—"Seamen, retail—prime A.B.'s supplied on shortest notice, delivered free on board, including kit; twenty-one shillings each for natives. Ordinaries—coloured sorts and landsmen, 35 per cent. reduction. Terms—advance notes for two months to be handed to dealer. N.B.—All warranted helpless for twenty-four hours." If our readers do not actually see a plain statement of such terms it will be because they do not look in the right place, not because no such terms exist: for disgusting and grim as the terms quoted may appear

[* We believe the Sailors' Home is a charitable institution, and we trust that the clergymen and others taking an active interest will support this virtuous resolve of only obtaining from Jack ten and sixpence, especially as there is no law by which payment of a farthing can be enforced.—Ed.]

to the uninitiated, they are, in plain English, and stated without circumlocution, exact versions of the unwritten terms of many contracts. It is a curious circumstance that the British seaman of 1879 should be the victim of a horrible combination of dealers; but so long as the advance-note system exists (the purchaser) the shipowner, or his agent, and (the retail dealer) the "shipping master" will continue to buy and sell Mercantile Jack: and for the reason that, while the buyer and seller transact their unholy and unlawful business, Jack himself (the party sold) pays for it. It is the only instance, of which we are aware, of a first party selling a chattel to a second party, and the chattel paying the purchase-money and commission to boot. The purchaser wants to get his ship to sea; and the salesman, as a free and independent elector, lives on the advance note. England is a wonderful country, and our institutions are admirable, but the writer of this article latterly found himself utterly unable to impress on the mind of an intelligent foreigner the beauties attendant on the purchase and sale of seamen under the advance note and crimping systems. Jack is protected by the law, and is distinctly informed that if anyone receives anything for obtaining employment for him on any ship, the person receiving it is liable to a heavy penalty or imprisonment; and yet in spite of this, and in spite of the fact that Jack could and would get a ship just as easily without employing an agent at all, he prefers to do it, and to waste his money. How true is the memorable saying of the "unhappy nobleman now languishing in Dartmoor," that "them as as muny and no braines is made for them as as branes and no munney." So long as boarding-masters, grogmen, shipping-masters, brothel-keepers and the like have votes and Jack has none, so long will they obtain his hard-earned wages, and he be overborne, saturated with drink and contagious disease, and bought and sold, wholesale and retail, in large and small numbers, as he is to-day. The crimps beat the combined forces of Sir Charles Adderley and the eldest son of Lord Shaftesbury over the last Merchant Shipping Bill. Will Lord Sandon fare better at their hands if he ever tries to accomplish the good work of aiding the seaman in this "unequal match?" Time will show.

"PRINCESS ALICE" AND "BYWELL CASTLE."

DECISION IN THE ADMIRALTY DIVISION OF THE HIGH COURT OF JUSTICE.

THE decision in this Court is as follows:—" These contradictions in the evidence given by the master and the pilot of the *Bywell Castle* have been duly weighed, and the testimony given by the forty-five witnesses examined has been carefully reviewed by the Elder Brethren and myself, and we agree in the following conclusions:—First as to the *Princess Alice.* It was competent to the *Princess Alice*, after rounding Tripcock Point, to have run up on either side of Galleon's Reach, due regard being had to the ordinary rules and practice of navigating the river. When the tide is adverse, as it was in this instance, it was usual for vessels after rounding a projecting point to go across the river for the purpose of what is called cheating the tide, the tide being slack on the opposite shore as far as the next point on that side. We believe this course to have been pursued by the *Princess Alice* on the evening of the 3rd of September last, and that she did pass over from Tripcock point, or thereabouts, towards the north shore. If she had intended to proceed up on the south shore of Galleon's Reach, it was her duty to have straightened up the reach immediately after rounding Tripcock Point, so as to make her intention manifest by showing her green light to vessels bound down the river. According to the evidence of Long, the surviving mate, this is what the *Princess Alice* did; but we think this evidence is overborne by both the testimony of other witnesses—such as that of the witnesses from the *Anna Elizabeth* and the *Plymouth*, vessels moored off the north shore, and from the *Enterprise*, which was running down—and also from the fact that the collision took place at a very short distance to the south of mid-channel. Therefore the *Princess Alice* must have been over to the north of mid-stream when she suddenly starboarded. It appears to us that when the *Princess Alice* was on a parallel course with the

Bywell Castle, red light to red light, if their respective courses had been continued they would have passed at a safe distance from each other; but when a very short distance, variously stated at from 100 to 300 or 400 yards, only intervened between the two vessels, the master of the *Princess Alice* ordered the helm to be put hard a-starboard, by which he brought his vessel athwart the bows of the *Bywell Castle*, and this fearful collision ensued. The captain of the *Princess Alice* having been unfortunately among the number of those who were drowned, it is impossible to ascertain the motive which induced him to give the order; but I may say that the Elder Brethren strongly incline to the belief that he was misled by seeing the green light of the tug *Enterprise*. There is, however, no evidence on this point. It appears to us, moreover, that the *Princess Alice* was navigated in a reckless and careless manner, without a due observance of the regulations respecting a look-out and speed. In our opinion the *Princess Alice* is to blame for this collision. It remains to be considered whether the *Bywell Castle* has in any way contributed to it. She appears to have been navigated with due care and skill till within a very short distance of the collision. But the evidence certainly establishes that, having seen the green light of the *Princess Alice*, she hard a-ported into it. There is no doubt that this was a wrong manœuvre. The only defence offered for it is that it happened so very short a time before the collision. There have been several cases decided in this Court in which it has been held that a wrong manœuvre taken at the last moment had really no effect upon the collision on account of the proximity of the two vessels. I have consulted anxiously with the Elder Brethren whether the wrong action of the *Bywell Castle* can be placed in this category. They are of opinion that if the wrong order of hard a-port had not been given and obeyed, though the *Princess Alice* might probably have received some injury, she would not have sunk, and the lives of her crew and passengers would probably have been saved. I am bound, therefore, to pronounce both vessels to blame for this collision." Execution was stayed.

This judgment is important in corroborating beyond question the accuracy of the statement of the facts of the case as elicited at

the inquiry before Mr. Balguy at Poplar. The facts proved in the two Courts are, that the *Princess Alice* was following the practice usual with her of crossing the river from Tripcock Point to Bull Point; that otherwise she ought to have straightened up to show her green light to ships passing down the river; that the *Princess Alice's* red light was at first opposed to the *Bywell Castle's* green light, the *Bywell Castle* ported, and the ships then became *red* to *red*, which was a position of safety; that the *Bywell Castle* was not wrong in porting to a *red* light; that the starboard helm of the *Princess Alice* did suddenly take effect when she was to the *north* of mid-stream; that the master of the *Princess Alice* did bring his vessel athwart the bows of the *Bywell Castle;* that the *Princess Alice* was navigated in a careless and reckless manner; that the *Princess Alice* was to blame for the collision; that the *Bywell Castle* did hard a-port after porting, and when (the Court say) the green light of the *Princess Alice* had become visible by the sudden starboarding of her—the *Princess Alice's*—helm. The Court hold that the *Bywell Castle* was wrong in that hard a-porting at the last moment, and therefore she also is held to blame. The decision that the *Bywell Castle* was also to blame raises a very distinct issue between the two Courts. The Court of Admiralty judgment admits that the collision might have happened, but with results probably less serious, if the *Bywell Castle* had not hard a-ported.

Was the *Bywell Castle* wrong, under the circumstances of this case, in doing what she did at the last moment in "the agonies of a collision?" We can ask this question, but may not answer it. There may be other points on which an appeal is deemed desirable by both sides, but to us, as lookers-on, the point we have indicated is of importance to the whole mercantile community. After the appeal is heard, and not until then can we express any opinion of our own. Meantime there is no longer any doubt as to the facts.

BOOKS RECEIVED.

The House Surgeon, or the Doctor at Home, &c. By the late Alfred Smee, F.R.S. Tenth edition. London: Accident Insurance Company (Limited).

This is an invaluable little book, price sixpence. It contains instructions for the prompt treatment of accidents and emergencies before the arrival of medical aid, and the instructions are given in the simplest and plainest manner possible. The little book should be on board every ship. By its aid many an accident could be divested of disastrous consequences.

Our Blue Jackets; a Narrative of Miss Weston's Life and Work among our Sailors. By an Eye-witness. London: Hodder and Stoughton. 1878.

The sailors among whom Miss Weston has worked, are the sailors of the Royal Navy only, and her work has consisted in endeavouring to bring men under the influence of Christian belief and principles, and to check the evils of intemperance. An establishment known as the "Sailors' Rest and Institute," set going by Miss Weston, at Devonport, appears from this narrative to attract a great many blue jackets, the inducements being comfort, moderate charges, entire absence of intoxicating beverages, considerate treatment, and religious services. According to the testimony of "an eye-witness," Miss Weston is doing a great amount of good among the sailors of the Royal Navy. If she could extend her labours so as to include the merchant seamen, she would find much greater need for her ministrations.

The Meteorology of the North Atlantic during August, 1873. Illustrated by daily charts. By Captain Henry Toynbee. London: J. D. Potter, 31, Poultry; E. Stanford, Charing Cross. 1878.

In our volume for 1877, pages 1,142 *et seq.*, will be found a paper prepared by Captain Toynbee on "The Great Hurricane, the

Tracks of American Storms, and the Ordinary Winds of the North Atlantic experienced in August, 1873."

The valuable works before us are an elaboration of that paper, and we need not therefore deal with the subject at length.

In August, 1873, a most destructive hurricane traversed a great part of the North Atlantic, which killed nearly 500 people; damaged, stranded, or wrecked more than 1000 vessels, and damaged or destroyed nearly 1000 buildings in the neighbourhoods of Cape Breton, Labrador, Nova Scotia, &c. Captain Toynbee's work is a careful and comprehensive view of all the circumstances connected with the origin and progress of this hurricane, derived from data chiefly supplied to the Meteorological Office by masters of vessels voyaging at that time in the North Atlantic. That this is a most useful record no seaman will venture to deny, and we trust that in the interests of Meteorological science and of Navigation this work may be the forerunner of many similar volumes in regard to other storms.

We have repeatedly appealed to masters of vessels to aid in the collection and dissemination of useful knowledge by furnishing the Meteorological Office with their experiences as regards weather at sea. It is impossible to estimate the actual value of such contributions, but there is little doubt that if the energetic workers at the Meteorological Office are well supplied with accurate records of weather they will be able to continue to promulgate information and advice, which cannot fail to be of the greatest service to the mariner. On this point we would refer our readers to an announcement from the Meteorological Office in our advertising columns.

Life of Robert Stevenson, C.E., &c., &c. By David Stevenson, C.E. Edinburgh A. and C. Black. London: E. and F. A. Spon. 1878.

Robert Stevenson's reputation as a civil engineer rests chiefly on the important works carried out by him in the lighthouse and harbour branches of engineering. The somewhat inposing volume before us gives an account of his various labours, but the erection of the Bell Rock Lighthouse stands out prominently from

all the rest. The conception and execution of this grand work are sufficient to ensure Mr. Robert Stevenson an enduring fame. He held the position of engineer to the Commissioners of Northern Lighthouses, and his experience and knowledge guided that body from 1798 to 1848, and since that time his sons, with hereditary intelligence, have continued to advise the Board.

In sundry other branches of engineering Mr. Robert Stevenson appears to have distinguished himself, and his professional career was a successful one. As a private gentleman he was much esteemed for his piety and benevolence, and in this volume his son pays a high tribute to his father's memory.

The book is splendidly got up, well printed, and illustrated with admirable diagrams and drawings, but although we have a high opinion of Mr. Robert Stevenson and his works, we cannot but think that the style of the memoir is more suited to a man who made a greater mark in life than Mr. Robert Stevenson. We must not, however, forget that the author of the memoir is the son of the man whose life and doings are so chronicled.

The Polysphenic Ship and Speed at Sea. By C. M. Ramus, M.A., Rector of East Guildford and Playden. London: Edward Stanford, 55, Charing Cross. 1878.

In his preface Mr. Ramus states that his pamphlet is written to keep before the country the consideration of a subject on which our continued existence as a naval power depends. This is an invention having for its object a large increase in the speed of ships, to be obtained by constructing them of such a form, that instead of going through the water, they shall, at high speeds, glide over it. Many former inventors have proposed to accomplish this by making the lower surface of the vessel an inclined plane. Mr. Ramus differs from them merely in proposing two inclined planes, believing that by this feature a stable and safe ship is secured. He has since increased the number of his inclined planes to three, and has altered the name from di-sphenic to *poly-sphenic*, we presume to cover any further increase in the number. He states that in April, 1872, he communicated the principle of the invention to the Admiralty, and was told by the

Chief Constructor of the Navy that it was "the very thing they were looking for." Subsequently arrangements were made for the model to be tested by Mr. Froude at Torquay, in connection with a series of experiments on resistance, which that gentleman was making for the Admiralty. It may be necessary for us to state that Mr. Froude is the originator of the generally received theory as to the relation existing between the resistance of models and of the full-sized ships represented by them. For many years it had been well known that results as to speed obtained with models were altogether illusory as indications of what might be expected in the full-sized ship. To Mr. Froude belongs the honour of having ascertained the law of the relation of speeds, which may be thus briefly and roughly stated:—If a model and a ship are moved at speeds, the ratio of which is the square root of the ratio of their dimensions, then the ratio of their resistances is the cube of the ratio of their dimensions. The trial took place in the presence of Mr. Ramus, and the results were not satisfactory; this the inventor attributes partly to the fact that his model was tried as he proposed it, without alterations being made from time to time as they suggested themselves to him. In this connection we may remark that his first proposals were of the crudest; the inclination of the planes was to be one in three, which he altered before the trial to one in eight, and now proposes to make one in thirty-five. In other respects he shows a lofty superiority to matters of mere detail. Altogether, after reading the Parliamentary papers on the invention, and, we may add, the present pamphlet, we cannot help seeing that Mr. Ramus utterly fails to appreciate the position which any inventor who hopes for success must take up. This method is to make a present to the world of one grand idea, to be worked out in detail by merely professional people. We may remind him that the real work of the successful inventor is in arrangement of details, and in overcoming the practical difficulties which always stand in the way of new schemes. When any great invention becomes a success it is usually discovered that many people have thought of its main feature before, but the honour of the invention justly goes to the man who has gone into practical details, and has grappled with and overcome practical difficulties.

If the author of the pamphlet before us, instead of denouncing unbelievers in his polysphenic ship as self-interested and wilfully blind, had but put himself through the discipline we have indicated, he would, we believe, have long ago seen the impracticability of his scheme.

Mr. Froude's results of the trials, interpreted by the rule we have given above, were: that at speeds less than 30 to 40 knots the bi-sphenic ship might be expected to be "tipped" merely, and not perceptibly lifted; at 70 to 80 knots she would be sensibly lifted, and at a speed of 130 knots the lifting would exceed half the displacement; but up to this point the resistance would not diminish, but would, on the contrary, increase. To these conclusions Mr. Ramus offers the plausible objection, that Mr. Froude's rule of comparison of ships with models is merely the result of experiments with a ship towed at ordinary speeds, and that it is not necessarily true when unprecedented speeds are in question. There is, however, the further result of the experiments which appear to us conclusive. At the highest speed, and when the model was lifted to a greater extent than half its displacement, so far from the resistance having diminished it had considerably increased, thus proving that even if the result of driving a "polysphenic" at high velocity be to decrease the immersed surface, the resistance per square foot of surface so much increases that the total resistance is not diminished. In other words even if a ship could be made to skim over the water, it would cost more power to so propel her than to drive her through the water.

Even if a vessel built in the shape of three consecutive wedges with a superstructure on top of them could be so propelled as to glide over the water at high speeds, the question would still have to be answered, What use could be made of her? Our inventor has in his own way approached this part of the question by stating his opinion that in a *moderate* sea the speed of the polysphenic ship would be increased because she would glide over the crests of successive waves, and in very rough weather her course would be no more impeded by large waves than is the case with vessels of the ordinary form. To us it appears that the lifting action of the wedges must be tangential to a large wave, and this would in

extreme cases throw the ship out of the water altogether, with the probability of her returning to it in such a direction as to bury herself in another large wave. This is of course on the false supposition that abnormally high speeds would be realised, but the absurdity of getting a vessel to glide over the ocean at fifty miles an hour, spurning the waves with her foot, is so patent to us and, probably to most of our readers, that they will excuse our stating further difficulties as to strain on structure, means of propulsion, &c.

In the pamphlet before us Mr. Ramus, with much Christian charity, accounts for the careful consideration which his proposals received by supposing that "it must have been by surprise that my invention was fortunate enough to have been admitted at the Admiralty, where every obstacle has generally been thrown in the way of all inventions tending to produce great changes;" but now he can only conclude that they "see in it a great interruption of their own case, and it may be some fancied interference with their own dignity, in the fact that they are to be taught by one who is not connected with the department." He also proposes an adaptation of the wedge-formed ships to rocket floats, which he believes will develope a sufficient force to destroy ironclads. He thinks that Government officials, although they know his views are correct, reject this last invention because it will take their work from them by rendering all war-ships useless, in fact it will "annihilate all the present armaments of naval warfare." He is patriotically apprehensive that our people may at some future time "find that iron-armoured ships, which can only be procured by means of millions of money, and by the operations of highly-organized bodies of skilled labourers, may be as easily used to crush their own liberties at home as to take away the freedom of the sea from other nations." Let us be thankful that there is a remedy: "The rocket-float, which will render all iron-armoured ships useless, will be the ready armament of liberty, and its safeguard on every shore."

When Mr. Ramus thus "drops into poetry" he is hardly more amusing than when in sober earnest trying to convince us that a projectile will gain in velocity by having to drag a tail through the water. After what we have quoted our readers will not be

surprised to hear from Mr. Ramus that the vested interests of the owners of the present Mercantile Marine and of shipbuilders have induced them also to reject an invention which will supersede existing ships, but that if they persist in their prejudices we "shall utterly and for ever lose our supremacy at sea."

General Average: York and Antwerp Rules. By Herr Jacob Ahlers. Hamburg: L. Friedrichsen and Co. London: Trübner and Co. 1878.

A USEFUL and well-written pamphlet has been published by Herr Jacob Ahlers on the York and Antwerp Rules, agreed to at the Antwerp Conference of the Association for the Reform and Codification of the Law of Nations, in September, 1877. After giving a summary of preceding meetings on this, to the commercial world, important question, held at Glasgow, 1860, in London, 1862, and in York, 1864, the author proceeds to render an account of the Antwerp Conference and the important conclusions arrived at. What constitutes a general average does not appear to be much disputed; indeed a singular agreement exists in all maritime states on this score, but what shall be held to be a damage resulting from such act, has been a matter of indifference for generations passed. Even the well-expressed 702 Article of the Common Code is at the best only directive, not a definition. It has thus resulted that in interpreting what damages shall be included in general average losses two systems have arisen, the universally adopted general benefit rule of the Continent and the United States, and the general safety rule of England. The author points out with great acumen that no option is left. Either the first must govern, held within bounds by reasonable restrictions, or the latter must prevail, which will ultimately compel each risk to be separately insured. That the latter result has not been accepted by the great shipping interests is proved by the assent given by a large proportion of our leading shipowners to the York and Antwerp Rules, which form a reasonable compromise between the two conflicting systems. With these preliminary comments the writer enters into a close analysis of the respective merits of the 12 rules voted at Antwerp, accompanied by an instructive summary of the discussion which took

place on each of them. It would take us beyond the limits we have allowed ourselves to do more than notice what the author has done referring the reader to his pamphlet for details. The appendix contains Mr. E. E. Wendt's address read at the Antwerp Conference, the Reports of the German Branch Association, of the Swedish, the Philadelphia Committee, that of the Sub-Committee of Lloyd's appointed to consider the York and Antwerp Rules, that of the Antwerp Committee, and finally the text of the York Rules and the York and Antwerp Rules. Of the many pamphlets published in Holland (Dr. Rahnsew); Berlin (Herr Ulrichs); New York (Mr. F. C. Condut); in Copenhagen (M. Thidt), etc., the treatise now before us may claim, it is thought, to be one of the most useful and well-considered hitherto given to the public, and we confidently recommend it to the consideration of the practical lawyer, the shipowner, and underwriter.

CORRESPONDENCE.

SHIPPING AND DISCHARGE FEES.

To the Editor of the "Nautical Magazine."

Dear Sir,—Have you space for a few words on a subject causing the strongest indignation just now among those concerned? I mean the frequent recurrence of "Shipping Fees."

The present law is the Act of 1840, before the advent of steam, and Jack was not intended to pay out of his hard-earned wages more than once a year on long voyages, or twice on shorter ones.

These fees have been steadily increasing, and now a New York liner, with her crew of 160 men making 10 voyages in the year, pays 5 or 6 times (not the men, but the ship), so that after paying all up on joining a ship hitherto laid up they must pay all over again on this new account possibly 12 times in all.

Now a change is to be made from the 1st of January, and these fees are to be payable after each voyage, which means 20s. per annum for seamen, 30s. for officers and stewards.

There are steamers (signally), Liverpool to Oporto, which make

22 voyages in the year, and it is indisputable that £3 is too heavy a tax out of an income of £36.

Among the minor absurdities it may be pointed out that many of those with smallest wages come under the larger fee and *vice versâ*. Surely where injustice is so flagrant it cannot long go unredressed.

Liverpool, December, 1878. A SUFFERER.

[This subject has been much discussed both in the London *Shipping and Mercantile Gazette* and in the shipping papers in the seaports. We recollect reading a very important letter in one of those papers pointing out that the Mercantile Marine offices are as much for the benefit of the seamen as of anybody, and that the same may be said of the rocket and mortar apparatus. Light-houses and light-vessels also add to his personal safety, and the survey of crew space is solely for his benefit, as are also the savings bank and money order systems. A seaman has no vote it is true, but then the whole of the systems we have named are kept up for his advantage, at least as much as for the advantage of any one. He pays no tax for them, and does not in any way contribute towards them excepting in this one respect of paying one shilling each time up to four times that he is engaged and discharged in the same ship at a Mercantile Marine office. Under the existing law an A.B. or O.S. cannot pay more than eight shillings a year if employed in the same ship. We think the present arrangement ought to be altered, so that payments of a shilling each, or eight shillings a year at the outside, spread over any number of payments, might make that seaman free for the year instead of making the ship free. A fixed sum also paid by short voyage ships making repeated voyages might with advantage render her free. But in fixing the amount of the payment care would have to be taken that neither the seaman nor the shipowner is freed from making a proper contribution in proportion to the benefits he receives. In many countries there are no light dues; this, however, does not benefit the seaman. But in this country so much is done for the shipowner and seaman for nothing, or next to nothing, in the matter of the registration of title, the freedom of shipping from all property tax, and the unlimited use (by the

seaman) of the surveying staff paid for by the taxpayer, and the deposit and remittance of money, that we are not sure on full consideration that in the matter of taxation Mercantile Jack is not fairly well off as it is. There can be no doubt that it is good policy to relieve shipping of every possible burden that is at all inconsistent with it, or is at all unnecessary, and we are quite sure that if the Board of Trade do not absolutely want the money contributed by Jack for engagement and discharge fees, they will be the first to remit them. We advise that our correspondent should approach the President of the Board of Trade, through Mr. David MacIver, M.P., or the member for his borough.—Ed. *N. M.*]

SHIPS' LIGHTS.

To the Editor of the "Nautical Magazine."

Sir,—Now that both the inquiry into the loss of the *Princess Alice* and the coroner's inquest are concluded, may I through your journal call the attention of the public to one point in connection with ships' side-lights which seems hitherto to have escaped comment.

There are frequently so many lights about the decks and sides of ships—more especially passenger ships—that it is by no means easy on a misty night for those on board a vessel meeting them to distinguish the proper side-lights. May I mention one such instance?

On a steamer proceeding up channel a green light was reported on the starboard bow. Seeing the light in that position the officer on watch concluded that she was clear, and gave his attention to other lights for a minute or two.

He then saw that the green light was drawing close ahead of him and immediately stopped the engines. Hardly had he done so when the sailing vessel showed a *red* light. As the engines were already stopped, by putting the helm hard-a-port a collision was narrowly avoided, and it was then discovered that the light first seen proceeded from the open door of a deck cabin painted green and strongly illuminated, whilst the red light being placed on the ship's quarter had been completely hidden by the sails.

I am, Sir, your obedient servant,

WALTER F. CLARK.

Cowich, Selby, Yorks., December, 1878.

INVESTIGATIONS INTO WRECKS.

To the Editor of the "Nautical Magazine."

SIR,—I have read with much interest the correspondence and the articles in the last number of the *Nautical Magazine* bearing on the subject of interference with ships and investigations into casualties; and although not a sailor by profession, I venture to trouble you with a few remarks; for these subjects, although professionally interesting to sailors, are also of great importance to the public by whom safety at sea is desired.

In the first place I agree entirely with what appears to me to be the main line of policy running throughout your leaders, that is to say, that the way to ensure safety is to fix the responsibility on the owner of the ship, and on those in charge of her and who are responsible for her; if it can be done. But my conclusion is that it cannot be done as fully and completely as the writers of your articles seem to believe. I think that the Government must, in the interest of all parties concerned, still retain the right of pronouncing a ship fit for carrying large numbers of passengers, because passengers in ships cannot know even so well as passengers on railways whether general preliminary safety has been attended to. And I cannot but think that the survey of a passenger ship, like the survey of the permanent way of a railway or tramway, must lead to safety. Nor do I see that such a preliminary survey need of necessity shift the responsibility from the owners of ships any more than it does from the owners of railways. As a member of the public I look with great disfavour on the enactment recently passed at the instance of the Board of Trade relieving large sea-going passenger steamers from examination when they only carry twelve passengers. The exemption may have been right if it had applied to tugs and river craft, but it is certainly wrong when applied to sea-going ships; and it always appeared to me that regardless of safety, or of any consideration, the Board of Trade carried that enactment as a sort of set-off or sop to steamship owners against Mr. Plimsoll's successful agitation, which has secured the detention of so many unseaworthy ships. If the Board of Trade, when they withdrew an inferior and therefore somewhat doubtful class of passenger ship from survey, had proposed an alternative measure of safety,

or had since in any way used any of their powers to ascertain and check dangers arising from deterioration of boilers and hulls, or from absence of safeguards in passenger steamers, the case would be different. To me it seems anything but satisfactory that a sea-going passenger steamer, because only carrying twelve passengers (and often of a lower class than steamers of the great lines, and therefore requiring more vigilance on the part of the police of the Government than the steamers of the great lines), should be withdrawn absolutely and completely from the surveyor's examination. And I learn on enquiry that a number of sea-going steamers, which once held passenger certificates from the Board of Trade, hold them no longer, and, moreover, that they could not now obtain them, owing to serious and dangerous deterioration; that these steamers continue to carry passengers ostensibly, but not really, under twelve in number; and that no effort of any sort is made by the authorities at Whitehall Gardens, or their local officers, to interfere in the interests of public safety. I do not know why this should be, unless it is that the Board of Trade, like your own leader writers, regard the survey of a ship as something to be avoided, and as being even a greater evil than loss of a few sailors lives. It seems to me, if such is the case, that it is riding a hobby a little too far, and indicates the mistake pointed out in the Premier's recent speech, which is the mistaking of "timidity" for "policy."

The Board of Trade possess large and wide powers enabling them to detain ships which are unsafe from any cause, but I have never heard that they interfere to prevent unsafe boilers, &c., from being used in steamers* that do not carry more than twelve persons as passengers, nor that any steps have been taken in that matter, nor do I understand that the Board of Trade, who are really public prosecutors, have ever taken proceedings under Section 507 of the Merchant Shipping Act, 1854 and Section 54 of the Act of 1862, referred to in your leader of December. It

[* We think our correspondent has not seen the lists of detained ships, because he would have discovered in it some detentions for defective boilers and machinery.—ED.]

is true and logical that they could not well proceed under those sections against a shipowner whose ship holds their own certificate, and this you have pointed out; but what I, as a member of the public, complain of is that the Board of Trade, having deliberately and intentionally withdrawn a large class of what are not the safest steamers from periodic inspection, have allowed those vessels to go to sea, voyage after voyage, as freely as if they were certified high-class steamers, with boilers brand-new of the best design and make. I must also take leave to point out that the Board would not, in the cases I am referring to, be finding fault with themselves, for they would not be proceeding against or interfering with steamers holding their imprimatur, but with steamers not holding it, and this in some cases because they are not fit to get it; and I do not therefore think that your excuse, urged on behalf of the apparent supineness of that Board for not proceeding, is applicable.

In the concluding paragraph of your article concerning the *Princess Alice* and *Bywell Castle* you state that the Wreck Commissioner's Court is improperly called a Board of Trade Court. Here, again, I think you are not accurate. I cannot fail to think that some good would arise out of a more free criticism in your columns and elsewhere of the decisions of the Wreck Commissioner's Court, but I do not see what good can come of your stating absolutely that it is not a Board of Trade Court, nor is this what the action of the Board of Trade proves. The Germans have followed the lead of this country in establishing Maritime Courts of Inquiry very much on the basis of the Wreck Commissioner's Court here, and their law, differing from the English, allows a Court of Appeal. In this country there is no appeal from the "Wreck Court" (and in this term I include, of course, the Justices of the Peace referred to by a correspondent in your last number), unless, through some action on the part of the Court, which may appear to the parties to be illegal, or outside the rules; and it is in consequence of an appeal of this sort that I am led to ask you to reconsider your own view that the Wreck Commissioner's Court is not a Board of Trade Court. I would refer you to the case of the *Ayton*, but am not able to say whether the Board of

Trade bore the expense of appeal in that case or not, but seeing that the Board's leading counsel was employed (and failed) to uphold the Wreck Commissioner's judgment, I can only assume that the Board found the money. The s.s. *Ayton* was stranded on the coast of Greece, on the 12th October, 1877, and having been got off, proceeded to London, where, on being examined in dry dock, she was found to have sustained "no damage." The Board of Trade contended before the Wreck Commissioner that the master's certificate ought to be dealt with; and the Wreck Commissioner adopted the view of the Board of Trade, and suspended his certificate for six months. One very noticeable point in this case is that, whereas the vessel was not damaged in any way, the Wreck Commissioner's Court reported to the Board of Trade that "the loss of the said vessel *Ayton* was due to Mark Storey, her master," at least, that is the statement contained in the printed official copy of the report of the Wreck Commissioner furnished to the public. Counsel for the master urged that the Wreck Commissioner's Court was wrong in dealing with the master's certificate, as the vessel having sustained no damage, the Acts of Parliament gave the Court no such power, and the master appealed to the Queen's Bench division of the High Court of Justice, when Mr. Bowen, the counsel for the Board of Trade, took up the case. The Lord Chief Justice declared judgment against the view taken by the Board and adopted by the Wreck Commissioner; and in expressing concurrence in the judgment of the Lord Chief Justice, Mr. Justice Mellor used these words: "He (the Wreck Commissioner) is in the matter, as it appears to me, the servant of the Board of Trade to conduct the inquiry." And Mr. Justice Manisty said, "I am of the same opinion." In the circumstances of the case, and seeing that the Board of Trade has attempted to uphold the decision of the Wreck Commissioner on appeal, and that two judges of appeal regard the Wreck Commissioner as the "servant of the Board of Trade," I trust you will be able to modify your own views that the Wreck Commissioner's Court is not a Board of Trade Court. If you had said it ought not to be, and was not intended to have been such a Court, I should have agreed with you, but when you say it is not, I must ask you to

bear in mind that two judges of the Court of Appeal and the general instinct of the country think otherwise. I must apologize for the length of this letter, but the subject is of so much importance that I hope you will be able to find room for it in your very useful magazine.

PATER.

Athenæum, December, 1878.

[We are glad to receive and to insert our correspondent's able letter. We are in no way apologists of, or advocates for, the Board of Trade views, or for anybody's views but our own; and we certainly think that the "withdrawing from survey" of the steamers referred to in the first part of our correspondent's letter, is wise. We should, of course, if we were about to make a voyage, select a surveyed and certified steamship in preference to another. That is, however, a matter of discretion, which may be exercised by every member of the public, but is beside the question. As regards the second point, we have only to say that if our correspondent will refer to the public press of the 25th November, he will find a letter signed by Mr. Talbot, the Parliamentary Secretary to the Board of Trade, in which that gentleman states that the "Court is entirely independent of the Board of Trade, and to call it a Board of Trade Court is a misnomer and is calculated to mislead. The function of the Board of Trade is to act as promoter of the inquiry, and to produce evidence and to raise the requisite issues." We can only say Mr. Talbot must know what are the functions and practice of the Board of Trade, and what is a misnomer as regards Courts of Inquiry better than ourselves, and this being the case we are content to quote Mr. Talbot's specific and public statement thereupon, by way of answer to our learned Correspondent.—Ed.]

A CREW FOR 1500 TON SHIP IN WINTER.

To the Editor of the "Nautical Magazine."

Sir—I am an old shipmaster and believing in having a ship well manned especially in the winter months in the English Channel of all parts of the world where you never know how

soon you may want to put out all the strength of my crew especially if the ship is on a lee shore but what is my astonishment to find the Wreck Commissioner in his Court is of a contrary opinion where he decided that a crew of seventeen hands all told is sufficient crew for the full-rigged *Enterprise* making a voyage down channel in the month of equinoctial gales and blowing a gale in the night W.S.W. and S.W. by S. and her tonnage being just 1500 with 595 tons of ballast and I should like to be told how the Captains who set with the Commissioner would like to be put in command of a ship in the winter to make that same passage with only them runners the sails blowing to ribbands and not enough men to think to cut away a hauser from the bows so keep her head to wind but shipowners in these hard times ought not to be told by a Court one man to the 100 tons is a compliment for such a ship as a tow line in a gale at sea is unsafe to be trusted to in winter and many steamships on the east coast is immediately bringing down their crews according to decision so I am told by my son Yours A. DROGGER Ipswich 20th December 1878.

[We have read the report of the case referred to by our correspondent, and find that the tow line parted, and the tug was unable to help. The following is an extract from the judgment of the Wreck Commissioner :—"As regards the first point on which our opinion is asked, namely, whether the *Enterprise* when she left London for Cardiff was sufficiently manned for the voyage, I am advised by my assessors that in their opinion she was. This vessel we are told when fully manned had a crew of 24 hands all told. She was to be towed from London to Cardiff, during which time the same number of hands will not be required. All the 17 hands too were runners, that is to say, all able seamen, whereas her complement of 24 men would include boys as well as seamen. We think, therefore, that the vessel with 17 hands was sufficiently manned for the voyage on which she was engaged, even considering the time of the year." We are not a court of appeal, and leave our readers to form their own conclusions. Our correspondent is an old practical seaman, who often gives us good sense in bad English.—ED.]

RULE OF THE ROAD AT SEA.

To the Editor of the "Nautical Magazine."

Dear Sir,—I beg to forward the accompanying remarks on Rule of the Road questions referred to in your numbers for January and July of this year, and to express a hope that they may be deemed worthy of publication in your useful Magazine at an early date.

Yours faithfully,

Auckland, New Zealand, October, 1878. T. C. T.

Remarks on Supposed Case in *Nautical Magazine*, January, 1878. (*See Diagram* 1.)

The wind is W.N.W. fresh. A is close hauled on port tack, heading North, speed 7 knots (∴ little or no leeway), and sights the red light of B, 1¼ points on her lee bow or bearing N. by E. ¼ E. To show possible positions at intervals of 2 minutes, A's place is marked for every two minutes. From B are drawn lines indicating the various courses she might be steering from close-hauled S.W. to S. by W. ½ W., when A would only be ¼ point on her lee bow. Dotted lines are also drawn connecting A 2 and B 2, to show changes in bearing on different courses of B, A holding on.

From these it will be seen that the danger point (+) will be (theoretically) with B going about 1½ points free, when a collision would probably occur in about 6 minutes from time of first sighting the lights at a distance of 1½ miles. With B going more than a point and a half free, she would pass to leeward of A, and if, say, only one points free or less, she would pass a-head; the different rates of speed given being such as may be considered equal to effect of keeping away when going 7 points close-hauled. + or the danger point having thus been ascertained to be about the place marked A 6^m, shows that B on sighting A's light had her 1¼ points on her lee bow, therefore showing (*i.e.*, B) side enough to let both her red lights be seen, if on the plan suggested by me; the after one being seen higher and a little separate from the bow light, indicating to A both that B was going free and would have to keep out of her way, and also that from the relative position of these two red lights B is coming so nearly end on to her, that it behoves A to be very watchful of her movements. And again if B's

lights are still more nearly in line, it will cause A to expect to see B's green lights very shortly, or, even supposing B to be so nearly end on (when by yawing she would probably show both *bow* lights) as to make A doubt if she sees one or two red lights; two minutes watching will decide, as if B is close-hauled she would then bear N. by E., if running N. by E. ½ E. easterly (ships of the class described would of course have a standard compass by which they could get the bearings with sufficient accuracy for practical purposes). And here, as in the other case I have mentioned (Mr. Martin's, in July number, 1878), I think the requirements of your correspondent would be met, viz., to show the length (in this case the converse or absence of it denoting nearly end on), and also what the ship was about, giving no occasion for the candidate to "send his ship to the bottom," or for the examiner to "floor him with No. 44."

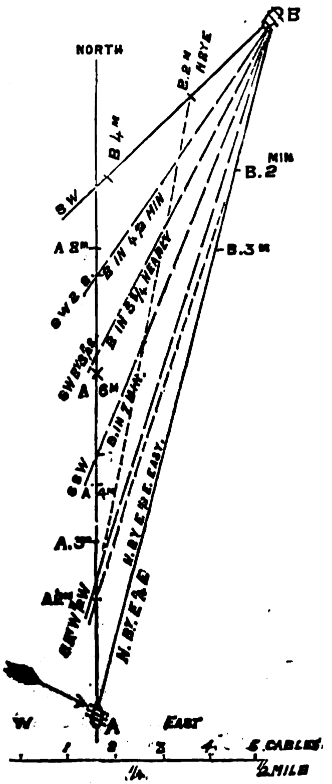


DIAGRAM 1.

B close hauled, S.W., 7 knots.
" 1 point free, S.W. by S., say 8·5 knots = 4·3 cables in 3 minutes.
" 1½ points free, S.W. by S. ½ S., say 9 knots = 4·5 cables in 3 minutes.
" wind astern, S.S.W., say 10 knots = 5 cables in 3 minutes.
A closed hauled, north, 7 knots.

REMARKS ON MR. MARTIN'S CASE IN *Nautical Magazine* FOR JULY, 1878. (*See Diagram* 2.)

The wind is north. A is steering east, and sees a green light 3 points on her port bow, or bearing N.E. by E.=B. B is, of course, running anywhere between, say, S.W. ¾ W., and S.E. by E.; probably there would not be very much difference between the speed of the two ships, assume it at 8½ knots=1 knot in 7 minutes. A is supposed instantly to haul sharp up, say E.N.E., and with a speed of, say, 6 knots. A reference to the figure and tables will now show that (theoretically) if B is steering from S.W. by W. to S.W. ¼ W., A will cross her bows before B could arrive at the point marked 1 (but if B's speed were greater than A's, it could hardly be done at all); and that with B steering S.W. ¼ W., collision must ensue at the danger point marked +. After this, or with B steering more to the southward, B would pass a-head of A; but I do not think she would see both red and green lights of A in time to be of any use, unless steering, say, from S.W. ½ S. to the southward. The danger point then (+) will be when B has A from ½ to 1 point on her bow, and this is not allowing any leeway to A; if, say, ½ point leeway were allowed, then A, 1 point on starboard bow of B, would be the collision bearing from B, or steering S.W.

Now to apply my proposal of double side-lights for all sailing vessels going free, as noticed in my letter published in your June number. Your correspondent in your January number (to which I referred in that letter), says, "What is felt to be wanted is that the lights should show the *length*, not the breadth of the ship," and this is exactly what I propose to do. A further consideration suggests that the after lights might be carried, perhaps best at the quarter davits, as this would not only raise it above the bow lights, but throw it out from the side, by which it would better show clear of the clew of mainsail. In the position of danger as marked above, viz., A from ½ to 1¼ points on B's starboard bow, A, when heading east, would show both her red lights separate to B, and B's green lights would both be seen by A, but the after one a little over, and barely clear of the line of the lower one; still, both would show, and, if not, then B must be so nearly end on that her red light must quickly show. From this I obtain that if

A sees the two green lights of B nearly one over another, she will best clear by keeping her course, or by keeping off a point ; but that if the green lights show distinctly separate, then keep a close luff, and put out her after lights, which would at once be an indication to B that she (A) is on a wind, and that on B it rests to keep clear. It may be suggested that the main braces would interfere with the after lights, but I think this might be obviated, even by taking the lights abaft the goose-neck.

A, steering east, sights green light of B, 3 points on port bow, distant 1½ miles.

The wind is north.

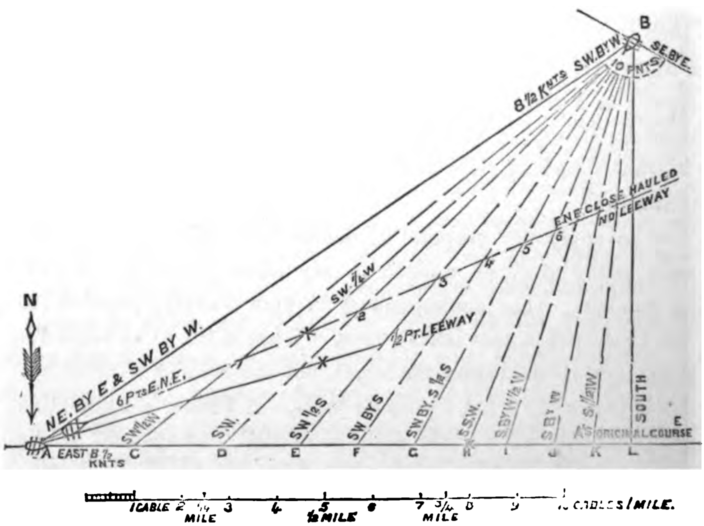
B is steering, say, between S.W. ¾ W. and S.E. by E. Speed, say, 8½ knots for each.

A is supposed to haul sharp up at once, or E.N.E. Speed, say, 6 knots.

Then A makes 1 knot in 10 minutes. B 1 knot in 7 minutes.

The points 1, 2, &c., C, D, &c., possible points of the contact (for illustration)—

Diagram 2.



TABLES OF DISTANCES TO BE RUN BY EACH TO POINTS OF CONTACT.

A keeps her course East, 8½ knots.

	Cables.		Mins.		Cables.		Mins.
AC ...	2½	=	0 ...	BC ...	13	=	9
AD ...	4	=	3 ...	BD ...	12	=	8½
AE ...	5¾	=	4 ...	BE ...	11	=	7¾.
AF ...	7	=	5 ...	BF ...	10	=	7
AG ...	8	=	6 ...	BG ...	9½	=	6½
+AH ...	9	=	6⅓ +	BH ...	9	=	6⅓ +
AI ...	10	=	7 ...	BI ...	8¾	=	6

A, close hauled, E.N.E., 6 knots = 1 cable a minute.

	Cables.		Mins.		Cables.		Mins.
A1 ...	5	=	5 ...	B1 ...	10	=	7
			+				
A2 ...	7½	=	7½ ...	B2 ...	8	=	5⅔
A3 ...	9	=	9 ...	B3 ...	6½	=	4½
A4 ...	10	=	10 ...	B4 ...	5⅓	=	3¾
A5 ...	11	=	11 ...	B5 ...	5	=	3½

[Our space is very valuable, but we are always ready to devote a page or two to our old correspondents at the Antipodes. That is, however, not the sole reason why we notice these letters. The problem solved is the most difficult one in the rule of the road, and it is one specially dealt with in Mr. Gray's book, and in this case there is the further question as to carrying two extra side-lights. We touch on the third point first, and in doing so we must say that we do *not* think the proposal for twc of such side-lights is within the limits of practical application, unless they are carried in places and relative positions to be rigidly adhered to in every ship. To be of use, the after light must be placed at a fixed and known distance aft of the fore one and at a fixed and known distance above it. If this is not possible then the scheme is not practicable. If an additional light is wanted for sailing ships it should, we think, be supplied by one lanthorn that can be used for three purposes. Such a lanthorn should have a green glass and a red glass, both moveable so as to be able to show red, white and green as wanted. The white light to be shown over the stern to warn overtaking ships, and the red glass to be used when the light is shown on the port side, to mean "I am close-hauled on the port tack," the green glass to be used on the starboard side, and to mean "I am close-hauled on the starboard tack." We cannot but think that such a light as that used as an auxiliary light would be of great use, and would add as materially to the safety of sailing ships as the proposed voluntary whistle signals will add to the safety of steamships. As regards the other question raised by these problems we thank our correspondent, as his diagrams and his lucid explanations, apart from his views as to an additional side-light fixed on each side of the ship, are, we think, especially valuable to our young readers, and interesting to our elder ones.—Ed. *N. M.*]

TIDE TABLES FOR JANUARY, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-Super-Mare. A.M.	Weston-Super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
W	1	7 22	7 45	—	0 11	9 7	9 36	8 1	8 30	10 47	11 18	4 25	4 46	11 55	—	4 26	4 54	5 10	5 35	10 19	10 50	4 31	4 59	1 39	2 13	9 15	9 46
Th	2	8 9	8 38	0 39	1 9	10 8	10 40	9 2	9 35	11 44	—	5 13	5 41	0 25	0 56	5 26	6 0	6 5	6 36	11 21	11 55	5 29	5 59	2 47	3 18	10 19	10 54
F	3	9 11	9 49	1 39	2 9	11 13	11 47	10 8	10 41	0 17	0 50	6 11	6 44	1 29	2 4	6 37	7 13	7 9	7 43	—	0 26	6 29	7 1	3 48	4 17	11 29	—
S	4	10 24	10 59	2 40	3 13	—	0 20	11 13	11 45	1 25	2 0	7 20	7 56	2 41	3 18	7 48	8 22	8 19	8 53	1 5	1 42	7 33	8 6	4 46	5 15	0 6	0 41
S	5	11 33	—	3 46	4 17	0 52	1 21	—	0 14	2 34	3 7	8 30	8 57	3 57	4 28	8 53	9 18	9 26	9 55	2 18	2 46	8 39	9 7	5 36	5 59	1 14	1 42
M	6	0 4	0 33	4 45	5 8	1 45	2 7	0 39	1 1	3 40	4 7	9 22	9 46	4 57	5 25	9 41	10 8	10 20	10 48	3 12	3 37	9 33	9 57	6 21	6 48	2 5	2 27
Tu	7	0 58	1 21	5 30	5 52	2 28	2 48	1 23	1 45	4 34	4 59	10 10	10 33	5 50	6 15	10 24	10 44	11 6	11 29	4 1	4 24	10 17	10 37	7 5	7 27	2 49	3 10
W	8	1 44	2 6	6 14	6 35	3 8	3 28	2 6	2 26	5 22	5 44	10 56	11 19	6 39	7 2	11 5	11 26	11 52	—	4 46	5 8	10 57	11 17	7 49	8 10	3 31	3 52
Th	9	2 25	2 44	6 56	7 17	3 48	4 8	2 46	3 6	6 5	6 25	11 41	—	7 23	7 43	11 47	—	0 15	0 37	5 29	5 50	11 37	11 57	8 29	8 47	4 13	4 33
F	10	3 8	3 23	7 37	7 57	4 28	4 48	3 25	3 44	6 45	7 5	0 8	0 25	8 2	8 21	0 8	0 29	0 57	1 17	6 10	6 30	—	0 17	9 5	9 23	4 53	5 13
S	11	3 42	4 3	8 16	8 36	5 9	5 30	4 4	4 24	7 25	7 45	0 47	1 9	8 40	8 59	0 49	1 9	1 37	1 57	6 50	7 11	0 37	0 58	9 41	10 1	5 33	5 53
S	12	4 24	4 43	8 56	9 17	5 51	6 13	4 45	5 6	8 5	8 25	1 31	1 53	9 18	9 37	1 29	1 49	2 17	2 37	7 31	7 51	1 20	1 42	10 21	10 41	6 12	6 32
M	13	5 4	5 23	9 38	10 0	6 35	6 57	5 28	5 51	8 45	9 6	2 15	2 37	9 56	10 15	2 9	2 30	2 58	3 19	8 11	8 31	2 4	2 26	11 3	11 28	6 54	7 16
Tu	14	5 44	6 7	10 22	10 45	7 19	7 42	6 15	6 39	9 27	9 49	2 59	3 19	10 33	10 51	2 51	3 13	3 40	4 2	8 51	9 13	2 49	3 12	11 57	—	7 38	8 1
W	15	6 30	6 53	11 10	11 38	8 8	8 36	7 8	7 30	10 13	10 38	3 41	4 4	11 10	11 33	3 35	3 58	4 24	4 47	9 35	9 58	3 35	4 1	0 27	1 6	8 25	8 51
Th	16	7 18	7 46	—	0 10	9 6	9 40	8 1	8 34	11 4	11 33	4 28	4 53	—	noon	4 26	4 57	5 12	5 40	10 25	10 58	4 31	5 3	1 37	2 16	9 21	9 56
F	17	8 16	8 50	0 43	1 18	10 18	10 58	9 11	9 51	—	0 7	5 22	5 57	0 33	1 12	5 35	6 19	6 13	6 52	11 38	—	5 37	6 14	2 55	3 34	10 36	11 19
S	18	9 30	10 13	1 54	2 32	11 33	—	10 31	11 12	0 45	1 25	6 35	7 19	1 54	2 39	7 3	7 47	7 33	8 18	0 20	1 4	6 52	7 32	4 10	4 45	—	0 6
S	19	10 55	11 37	3 12	3 52	0 19	0 56	11 50	—	2 6	2 47	8 2	8 39	3 24	4 6	8 27	9 1	8 59	9 30	1 48	2 27	8 12	8 48	5 17	5 45	0 47	1 23
M	20	—	0 15	4 27	4 58	1 29	1 59	0 23	0 53	3 28	4 4	9 12	9 43	4 46	5 21	9 33	10 0	10 10	10 40	3 2	3 34	9 23	9 54	6 13	6 40	1 57	2 25
Tu	21	0 50	1 18	5 26	5 52	2 26	2 51	1 20	1 47	4 36	5 3	10 11	10 37	5 52	6 19	10 25	10 48	11 8	11 34	4 2	4 28	10 20	10 41	7 7	7 31	2 51	3 14
W	22	1 45	2 8	6 16	6 39	3 18	3 34	2 10	2 32	5 26	5 48	11 2	11 25	6 44	7 7	11 11	11 33	11 58	—	4 51	5 13	11 2	11 23	7 54	8 16	3 36	3 58
Th	23	2 29	2 49	7 1	7 22	3 54	4 14	2 53	3 11	6 10	6 31	11 47	—	7 28	7 48	11 54	—	0 21	0 42	5 34	5 55	11 42	—	8 34	8 52	4 18	4 37
F	24	3 9	3 27	7 42	8 0	4 33	4 51	3 29	3 47	6 52	7 9	0 8	0 28	8 6	8 23	0 14	0 33	1 2	1 21	6 13	6 31	0 1	0 20	9 8	9 24	4 55	5 12
S	25	3 45	4 3	8 17	8 34	5 9	5 26	4 4	4 21	7 25	7 41	0 47	1 0	8 39	8 54	0 50	1 6	1 39	1 55	6 48	7 4	0 38	0 55	9 39	9 54	5 29	5 45
S	26	4 20	4 37	8 50	9 6	5 43	6 0	4 38	4 55	7 57	8 12	1 23	1 40	9 9	9 24	1 22	1 37	2 11	2 27	7 20	7 36	1 12	1 29	10 10	10 26	6 1	6 17
M	27	4 53	5 9	9 22	9 38	6 17	6 34	5 12	5 28	8 26	8 40	1 57	2 14	9 39	9 52	1 53	2 9	2 48	2 59	7 52	8 7	1 46	2 3	10 42	10 58	6 33	6 49
Tu	28	5 24	5 39	9 54	10 10	6 50	7 6	5 45	6 3	8 53	9 6	2 30	2 46	10 5	10 18	2 25	2 41	3 14	3 29	8 22	8 37	2 20	2 37	11 16	11 33	7 5	7 22
W	29	5 54	6 11	10 28	10 46	7 25	7 44	6 22	6 41	9 21	9 36	3 8	3 20	10 31	10 44	2 57	3 13	3 45	4 2	8 52	9 8	2 55	3 18	—	0 1	7 39	7 56
Th	30	6 29	6 48	11 6	11 29	8 4	8 26	7 0	7 21	9 54	10 14	3 37	3 54	11 0	11 20	3 29	3 48	4 19	4 37	9 25	9 45	3 31	3 51	0 24	0 51	8 15	8 37
F	31	7 9	7 32	11 57	—	8 52	9 25	7 47	8 19	10 38	11 8	4 14	4 39	11 47	—	4 12	4 42	4 58	5 27	10 11	10 48	4 17	4 49	1 28	2 1	9 6	9 39

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add.* − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordonan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 58	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 6, Lord Street, Liverpool, and 323, High Holborn, London, W.C.

ENGLISH (APPLICATIONS).

4633. Frank Ricardo Francis, Lawford Road, London, Engineer. "Improvements in apparatus for ship-steering indications and other purposes."

4654. Henry Lüdecke, Peckham. "Improvements in the mode of and apparatus for indicating and registering the speed, distance, and position of vessels at sea, whether and how far deviating from their course."

4661. Alexander Friedmann, Vienna, Engineers. "Improvements in apparatus for increasing the draft in the chimneys of steamships, and in other chimneys or funnels."

4729. Wm. Bell, Messrs. W. Walker & Co.'s, Deptford Green Dockyard, London. "An improved system of longitudinal framing, combined with diagonal beams and pillars, constituting an arrangement for the construction of iron or steel vessels, the principle of which is especially applicable to vessels of extreme proportions, and to torpedo boats and river steamers where great lightness is required, as well as for all vessels wherein water-ballast tanks or water-tight partitions have to be fitted."

4788. Wm. Jas. Damer, Peckham. "An improvement in the means of stopping leakage and of saving vessels which have suffered fracture from collision, shot, ram, or other casualty."

4802. Wm. Waring, London. "Improvements in or additions to ships' logs."

4874. Middleton Pratt, Rood Lane, London, Engineer. "Improvements in screw propellers, and method of driving."

4910. Isaac Blue Harris, Edinburgh. "Improvements in pontoons, constructed of textile materials."

4918. Edwin Ruthven Whitney and Horace Janson Beemer, Montreal, Canada. "Fog-horns and signals."

4919. Josiah Latimer Clark and John Standfield, Civil Engineers, Westminster. "Improvements in apparatus for and in the mode of constructing artificial breakwaters, groins, piers, and other submarine foundations."

4954. Frederic Bradley, Kidderminster, Worcester. "Improvements in steering apparatus."

4959. Charles Ambrose McEvoy, Adelphi, Middlesex. "Improvements in torpedo apparatus."

4987. John Louis Lay, Paris, France. "Improvements in apparatus for propelling, guiding, firing, and otherwise controlling or operating torpedo boats."

5007. Edmund Thompson, Sutton, Surrey. "Improvements in the bridges, seats, and other deck fittings of vessels to render them available as floats or rafts for saving life in case of accident, such as vessels sinking."

5042. James Long, Brighton. "Improvements in the construction of ships and vessels."

5088. James Ballantyne Hannay, Glasgow. "A new or improved chemical compound or mixture for preventing the fouling of ships' bottoms, and other submerged surfaces, part or parts whereof are adapted as a paint or varnish for protecting other surfaces."

5099. Joseph Burridge, Middlesex. "Improvements in or connected with rockets to be used for war, life-saving, and illuminating purposes."

5137. Kate Jessie Abercromby Maxwell King, Victoria Park, London. "Improvements in apparatus for saving life from drowning."

ABRIDGEMENTS.

1499. Frederick Charles Weir, of Clifton. "Improvements in apparatus or appliances for supporting persons in water." The apparatus presents the appearance of a jacket, to which are attached five or more hermetically sealed cylindrical vessels, made of tin in front and a similar number at the back. They are arranged either vertically or horizontally, and the whole is secured

to the body of the wearer by means of straps. When packed the apparatus occupies a comparatively small space. It is called by the inventor the "Seamen's Safety."

1519. Henry Schallehn, of 34, Albert Terrace, Clapham Road, Manufacturer. "An apparatus for raising ships, anchors, chains, telegraph cables and other property sunken in the sea, or rivers, or lakes." This apparatus may be constructed in various forms. In one it is formed in the shape of an anchor, a hammer hinged to the shank taking the place of one of the prongs, which being operated by means of a chain forces the other prong into the object to be raised. In another form, more particularly adapted to recovering telegraph cables and the like, the shank terminates at the bottom in a curved hook at the base of which is a notched recess into which the telegraph cable or other article lodges. The shank is provided near the base with an arm turning on a swivel, to which rollers are attached to enable the apparatus to avoid any obstruction encountered. The extremities of this arm are connected by chains crossing one another to a longer bar turning on a swivel higher up the shank. The play and position of these arms is regulated by means of ropes connecting the extremities of the upper arm with the guide cable. A grappling hook, constructed with serrated teeth, to effect a more certain hold, can be used with this apparatus or alone. Another form of grappling hook, also particularly intended for raising telegraph cables, and the like, is constructed with supplementary arms acting as levers, the cable attached to which being straightened, causes serrated jaws to close over the article to be raised.

1609. Herbert Wadsworth, Geneseo, U.S. "Improvements in mechanism for effecting the movement of rudders of vessels, the steering wheels of road wagons, shifting or reversing levers of locomotives, and various other objects." This consists of an arrangement of a way-cock adapted to control the entrance and exit of water to or from a cylinder, operating the moving body, and in combination with a cut-off valve acted on by the tiller or moving body, and moving over the ports of the valve seat, so controlling the movements of the piston.

1696. John Colvin Thomson, Brooklyn, U.S. "Improvements

in or applicable to berths for passengers, and pens, stalls, or boxes for animals on shipboard to retain them in a level position, and to prevent sea-sickness." Posts are fixed between the decks, and to each pair of posts is pivoted a dividing cross-bar or frame, to each side of which is pivoted or hung a berth or pen. The pivots are hung on springs, and the berths or pens are suspended above the centre of gravity, so that the weight of the occupant serves to counterbalance the apparatus.

1838. Rev. George William Garrett, of 82, Chorlton Road, Manchester. "Improvements in, and appertaining to, submarine or subaqueous boats or vessels for removing or destroying, laying, or placing torpedoes in channels and other situations, and for other purposes." This invention relates to a new description of boat, which, on being closed, can descend and be navigated under water. The boat is caused to lose her freeboard by ballast tanks, and then her depth of submersion can be regulated with the most exact nicety by an arrangement of hydraulic ram working in a cylinder, and operated by simple gearing. Means of propulsion and steering are provided, and elastic sleeves allow the operator to grasp or manipulate objects in the water. The electric light furnishes the means of illumination. This invention was most successfully tested in the presence of a number of scientific gentlemen on August 7th last, at Birkenhead. Mr. Garrett remaining for several hours in his novel craft, chemical means affording respiration.

2770. Empson Edward Middleton, Southampton. "An improved method of building ship, yacht, sailing boat, and other vessel, and of altering by lengthening by the stern the after hull of ship, yacht, sailing boat, or other vessel." This consists in using a long counter, the stern post being placed at an angle instead of perpendicular. The rudder is somewhat of a shield shape, and works against said stern post. When propellers are used they can be placed above or below the rudder. The stern is constructed finely, so as not to offer much resistance to the water.

AMERICAN.

208952. Peter Boisset, New York. "Improvement in propelling vessels." This consists in providing vessels with paddles

which are fixed to oscillating arms, operated by crank rods. The paddles are hinged to the oscillating arms, so that on the return stroke they may offer no resistance to the water. One or more paddles may be provided according to the speed required, and they may be fixed either outside the vessel, as in the ordinary manner, or in the centre, enclosed in a well. The latter arrangement protects them against injury from ice or other obstructions.

209052. Edgar Jerome, Albany, New York. "Improvements in means for indicating the water-level in steam-boilers, water-tanks, ship-holds, and the like." For indicating the water-level in boilers two shallow chambers are provided, one of which is fixed below the lowest water-level, and the other above the highest water-level, of the boiler. In connection with these is arranged, at any distance, an indicating tube. The water flows from the boiler into the lower chamber, and, as the height of the water in the boiler varies, so does the pressure exerted upon the compressed air in the upper portion of the chamber. This variation of the pressure of the air is conveyed and registered by means of a small tube to the indicating tube. Into the upper chamber steam is admitted, and its pressure upon the enclosed compressed air is likewise registered in the indicating tube. When this apparatus is applied to indicate the level of water in other arrangements than steam-boilers, the upper chamber may be omitted.

209200. John Blake Tarr, Fairhaven, Bristol County, State of Massachusetts. "An improved fog and alarm whistle." This is a whistle operated by manual power. It consists of an air cylinder provided with a piston, to the rod of which is attached a handle. At the farthest end of the cylinder is fixed an ordinary whistle. The air is admitted to the cylinder through the circular opening of the whistle by pulling the piston to the extent of the cylinder and expelled through the same opening of the whistle (thereby causing the same to sound) by pushing back the piston. The whistle may be placed at either end of the cylinder so as to sound at either a pull or a push of the piston.

209267. Samuel W. Irwin, Columbia, Co. of Richland, State of South Carolina. "Improvement in propellers." This relates to submerged propellers, and is applicable to steam vessels

and balloons. The blades of the propellers are arranged on the main shaft in such a manner that those uppermost not being employed in propelling the vessel are turned edgewise by suitable mechanism, thus offering no resistance to the medium. By turning the lower blades of the propellers edgewise instead of the upper, the shaft continuing its rotation, a reversed motion is obtained.

BELGIUM.

46630. M. H. Alberger and S. W. Pettit. "Improvements in telegraphic cables and in their manufacture."

46666. A. Farry. "An apparatus for maintaining the water level in steam boilers."

FRANCE.

124432. Bazin. "A vessel with beams (*balanciers*)."

124447. Lagarde. "A boat propelled by hydraulic pressure."

124285. Conti de Barbaran. "A helicoid engine for propelling vessels, &c."

124257. Wadsworth. "A motor for rudders, carriages, &c."

124276. Bastard. "A system of oars."

124381. Bourke. "Apparatus for launching boats, &c."

124425. Castaing. "A life apparatus."

124476. Febore. "Illuminating the surface of balloons."

124347. Somzée. "A submarine bridge."

GERMANY.

3581. E. Cutlan, London. "An apparatus for cleaning ships' bottoms."

BRITISH INDIA.

89/77. J. Pintsch, Berlin, Engineer. "Improvements in floating-lights, and in apparatus for the same."

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
1	England—Entrance to Thames—East Swin	New buoy.
2	Ireland—East Coast—North Arklow	Proposed alteration of light.
3	„ S.E. Coast—Tuskar Rock	Proposed rocket fog-signal.
4	„ South Coast—Poor Head	Proposed siren fog-trumpet.
5	North Sea—Netherlands—North Sea Ship Canal	Alteration of lights.
6	„ „ Egmond-aan-Zee	Proposed alteration of lights.
7	„ „ Zuider-Zee—Harlingen	Re-exhibition of light in new position.
8	„ Schleswig-Holstein — Sylt Island—Munkmarsch	New leading light.
9	Baltic Entrance—Sound—Svinbadarne	Temporary light-vessel, and fog-bell.
10	Baltic—Sweden—Öland Island	Alteration of light.
11	„ „ „	Alteration of light.
12	„ „ Grimskär	Alteration of light.
13	„ Prussia—Lubeck Bay—Buch Point	New light.
14	„ „ Rugen Island — Cape Arkona	New siren fog-trumpet.
15	„ „ Danzig	New siren fog-signal.
16	Gulf of Bothnia—Sweden—Ago Island	Fog-signal discontinued.
17	France—West Coast—Ile aux Moutons	New light.
18	Mediterranean—Spain—Tarragona	New harbour light.
19	„ „ Grosa Island	Bell-buoy.
20	Black Sea — Sevastopol — Cape Khersonese	Temporary alteration of light.
21	„ Kertch Strait—Cape Yenikale	Temporary alteration of light.
22	North Atlantic—Canary Islands	Floating wreck.
23	India—Bay of Bengal—Cheduba Island	Reported sunken danger.
24	„ Martaban Gulf—Krishna Shoal Light-Vessel	Blue lights and maroons.
25	China Sea—Cochin-China—Banks	Report on various dangers.
26	China—East Coast—Wusung River	Alteration of lights and buoys.
27	Japan—Meac-Sima Group	Particulars respecting the islands.
28	„ Vincennes or Pallas Rocks	Soundings around, and position.
29	United States — Virginia — Elizabeth River	Alteration of light.
30	„ Long Island Sound —Race Rock	New light and fog-bell.
31	„ Long Island Sound —Stratford Shoals	Alteration of light.
32	Canada—Bay of Fundy—Machias Seal Island	New light-tower, &c.

NAUTICAL NOTICES.

1.—England.—*Entrance to the River Thames.—New Buoy in East Swin.*—With reference to Notice, see p. 1,120, vol. for 1878, an 8-foot can buoy, in *Black and White Vertical Stripes*, marked "West Hook Middle," has been placed about midway between the S.W. Middle and North Hook Middle Buoys, in 7 fathoms, with the following marks and bearings, viz.:—Whitaker and Buxey Beacons, in line N.W. Wly.; Brightlingsea Church Tower $\frac{1}{3}$ from No. 2 Martello Tower, on the Mound towards Brightlingsea Chapel, N. $\frac{1}{4}$ W. Wly.; S.W. Middle Buoy, S.W. by W., distant $1\frac{5}{10}$ miles; Swin Middle Light-vessel, W. by S. $\frac{1}{2}$ S., distant $1\frac{3}{10}$ miles; Whitaker Beacon, N.W. Wly., distant $1\frac{1}{10}$ miles; Whitaker Buoy, N.E. by N., distant $1\frac{6}{10}$ miles; North Hook Middle Buoy, E. by N. $\frac{1}{2}$ N., distant $1\frac{6}{10}$ miles. Also an 8-foot conical buoy has been substituted for tho can buoy formerly at the Rough.

2.—Ireland.—*East Coast.—Intended Alteration in North Arklow Light.*—During the spring of 1879, the two fixed lights now shown from North Arklow light-vessel will be discontinued, and in lieu thereof *one revolving* light will be exhibited, showing *two flashes* in quick succession, followed by an interval of *forty-five seconds* of darkness, the whole revolution occupying *one* minute. The light-vessel will be distinguished in the day-time by having one mast with a ball at the masthead, and a jigger mast. Further notice will be given.

3.—Ireland.—*S.E. Coast.—Fog Station at Tuskar Rock Lighthouse.*—On or about the 1st of February, 1879, a *rocket* fog-signal will be established at this lighthouse. The rockets will be discharged *every five minutes*, which, on reaching an altitude of about 400 feet, will *explode with a loud report.*

4.—Ireland.—*South Coast.—Cork Harbour.—Intended Fog-Signal at Poor Head.*—To be established early in 1879, at Poor Head, 3 miles south-eastward of the entrance to Cork Harbour. It will be a siren trumpet, which, during thick and foggy weather, will give *one* blast of *five seconds'* duration every *two minutes.* Further notice will be given.

5.—North Sea.—Netherlands.—*North Sea Ship Canal.—Alteration in Leading Lights at Noordzee (Ymuiden) Harbour.*—On or about 1st January, 1879, two lights will be exhibited from light-houses recently erected on the south side of the canal entrance, and which, when in line, will lead in mid-channel through the outer harbour. They will be *fixed white* lights, elevated 169 and 136 feet respectively above high water, and visible from seaward between the bearings N.E. by N. and S.W. by S. from the distances of 19 and 18 miles. The lighthouses, constructed of iron, and circular in shape, are painted in red and white bands; they are situated westward of the sea sluices, on the south shore of the canal, and bear from each other S.E. by E. ⅜ E. and N.W. by W. ⅜ W., distant 612 yards. Position of low lighthouse, lat. 52° 27′ 45″ N., long. 4° 34′ 30″ E. On the exhibition of these lights, the temporary leading lights (red and white) will be discontinued. *Variation,* 16¼° *W.*

6.—North Sea.—Netherlands.—*Temporary Discontinuance and Intended Alteration in Egmond-Aan-Zee Lights.*—The two lights (fixed white) are to be replaced by fixed *red* lights.

7.—North Sea.—Netherlands.—*Zuider Zee.—Harlingen.—Re-exhibition of Outer Leading Light, Pollen Channel.*—The outer leading light (*fixed white*) is now re-exhibited from a structure on the North Harbour Mole, 55 yards westward of its former position. This light, in line with the innermost or south light, leads southward of the dam, through Pollen Channel, which has been re-buoyed.

8.—North Sea.—Schleswig-Holstein.—*East Side of Sylt Island.—Light at Munkmarsch Harbour.*—In addition to the Northern leading light (*fixed white*), established in 1877, the Southern leading light (*fixed white*) is now exhibited. These lights in line lead through the channel recently made between the sand banks, to Munkmarsch harbour; they should be visible through an arc of 90°, between Lister Ley and Wester Ley, from a distance of about 6 miles.

9.—Baltic Entrance. — Sweden. — *The Sound. — Temporary Withdrawal of Svinbadarne Light-Vessel, and Alteration in Fog-Signal.*—This light-vessel has been withdrawn from her station

westward of Jungnäs shoal, and replaced by another light-vessel; and during thick and foggy weather, whilst the temporary light-vessel is in position, a bell will be rung.

10.—BALTIC.—SWEDEN.—*Öland Island.—Alteration in Södra Udde Light.*—This light, on the south extreme of Öland island, has been altered as follows:—It is a *fixed* and *flashing* light, showing *fixed* to seaward and over Kalmar sound, between the bearings of S. 11° W. and S. 16° E.; *two flashes* in quick succession followed by an eclipse of *four seconds'* duration between the bearings S. 16° E. and S. 9° E.; *fixed* between S. 9° E. and S. 4° W.; and a *single flash* of one second duration followed by an eclipse of *four seconds* between S. 4° W. and S. 11° W. *Variation*, 9¾° *W.*

11.—BALTIC.—SWEDEN.—*Öland Island.—Alteration in Ispe Udde Light.*—This light (fixed), on the west side of Öland Island, now shows *white* between the bearings N. 56° E. and N. 70° E.; *red* between N. 70° E. and S. 18° E.; and *white* between S. 18° E. and S. 33¾° W.

Note.—It is intended at a future date, that the light shown between the bearings N. 56° E. and N. 70° E. shall be a *flashing* light. *Variation*, 9¾° *W.*

12.—BALTIC.—SWEDEN.—*Kalmar Sund.—Alteration in Grimskär Light.*—With reference to notice in 1878, the following alteration has been made:—The light is a *fixed* and *flashing* light, showing *two flashes* in quick succession followed by an eclipse of *four seconds'* duration between the bearings N. 1° E. and N. 17° E.; *fixed* between N. 17° E. and N. 34° E.; and a *single flash* of one second duration followed by an eclipse of *four seconds* between N. 34° E. and N. 50° E. In the approach to Kalmar harbour from the northward, there are also shown *two flashes* in quick succession followed by an eclipse of *four seconds'* duration between the bearings S. 31° W. and S. 35° W.; a *fixed* light between S. 35° W. and 37½° W.; a *single flash* of one second duration followed by an eclipse of *four seconds* between S. 37½° W. and S. 41½° W.; a fixed *red* light between S. 41½° W. and S. 53° W.; and a *fixed* light between S. 53° W. (through west) and N. 1° E. *Variation*, 9¾° *W.*

Note.—With Grimskär lighthouse bearing between N. 17° E.

and N. 34° E., at the distance of 3 cables, there is a depth of 2¼ fathoms; and with the lighthouse bearing between S. 35° W. and S. 37½° W. at the distance of 6½ cables, there are 2 fathoms water.

13.—Baltic.—Prussia.—*Lubeck Bay.—Light at Buch Point.*—Exhibited from a lighthouse recently erected on a conical hill about $1\frac{3}{10}$ miles southward of Buch point. It is a *flashing* light, showing a flash of about *six seconds'* duration every *fifteen seconds;* elevated 312 feet above the sea, and visible about 17 miles; a sector of *red* light (*flashing*) will be shown over the shoal ground of Wismar bay, between the bearings E. ¼ N. and N.E. ¾ E., which should be visible 14 miles. The lighthouse, 68 feet high and circular in shape, is painted red with white bands, lantern of a dark colour; with keeper's dwelling (one story) attached. Position, lat. 54° 7′ 55″ N., long. 11° 41′ 40″ E. *Variation, 12¼° W.*

14.—Baltic.—Prussia.—*Rugen Island.—Fog-Signal at Cape Arkona.*—A *siren trumpet*, worked by a caloric engine, which during thick and foggy weather will give *one* blast of from *five to six seconds'* duration *every minute.*

15.—Baltic.—Prussia.—*Fog-Signal at Danzig.*—A siren apparatus has been established at the Pilot Office, Neufahrwasser, port of Danzig.

16.—Gulf of Bothnia.—Sweden.—*Discontinuance of Ago Island Fog-Signal.*—The fog-signal at Ago island lighthouse, approach to Hudiksvall, is discontinued.

17.—France.—*West Coast.—Light on Ile aux Moutons.*—On January 1, 1879, a *fixed* light with *white, red,* and *green* sectors, showing over various rocks, will be shown from Ile aux Moutons, one of the Glenan isles. Further particulars in next number.

18.—Mediterranean.—Spain.—*Harbour Light on Inner Mole, Tarragona.*—Provisionally exhibited on the extremity of the Inner or Transverse mole, in course of construction. It is a *fixed green* light, elevated 16 feet above the sea, and visible 3 miles; it is obscured between the bearings S. 34½° E. and S. 50½° E. This temporary light is shown from a stanchion on a platform (removed by day) and bears N. 29° E., distant 2½ cables from the Eastern mole head light.

19.—MEDITERRANEAN.—SPAIN.—*Grosa Island.—Bell-buoy on Laja Grosa.*—The *bell-buoy* of Laja Grosa (a rock north-easterly from Grosa island) is anchored in 17½ fathoms water, 130 feet south of the bank, and with 33 fathoms of chain.

20.—BLACK SEA.—*Sevastopol Harbour.—Temporary Alteration in Cape Khersonese Light.*—During repairs of the apparatus of the revolving light a *fixed white* light will be exhibited, elevated 108 feet above the sea, and visible 12 miles.

21.—BLACK SEA.—*Kertch Strait.—Temporary Alteration in Cape Yenikale Light.*—Pending the completion of the lighthouse in course of construction on Cape Panagia, eastern side of entrance to Kertch Strait, the following alteration has been made in the light exhibited at Cape Yenikale:—The light (flashing) is now visible between the bearings N.N.E. (through west) and S.S.E. *Variation*, 1¼° *W.*

22.—NORTH ATLANTIC OCEAN.—*Floating Wreck Westward of Canary Islands.*—On 26th July, 1878, the wreck of a vessel (lying bottom up and showing very little above water) was seen in lat 28° 30′ N., long 20° 40′ W. This would be in the track of shipping bound from Europe across the Equator. In this locality the drift current sets to the south-west and west at an average rate of about 8 or 10 miles in a day.

23.—INDIA. — *Bay of Bengal.—Burmah.—Reported Sunken Danger North West of Cheduba Island.*—The following information, relative to the existence of a reported sunken danger lying about 8 miles north-westward of Beacon islet, Cheduba island, is on the authority of the Commander of the British India Steam Navigation Company's steam-vessel *Avagyee*, who observed heavy rollers and breakers indicative of a shoal patch, with probably only 2 or 3 fathoms at low water; lying with West point, Ramree island, bearing N. by E. ½ E.; North-west point of Cheduba island, bearing S.E. by S. Position as given, lat. 19° 2′ N., long. 93° 21′ 30″ E. *Variation*, 2½° *E.*

Caution.—The neighbourhood of Cheduba and Ramree islands being imperfectly known, mariners should navigate in the locality with care.

24.—INDIA.—*Martaban Gulf.—Blue Lights and Maroons at*

Krishna Shoal Light-Vessel.—To be exhibited, between sunset and sunrise, a *blue light* every half hour, and a *maroon* at the intermediate quarter hours.

25.—China Sea.—*Cochin-China.—Almazon, Duchaffaut, and Althea Banks.*—On examination it has been found that Almazon and Duchaffaut banks are a portion of a series of shoals separated by channels, with depths of 6½ to 9¼ fathoms. The base of these shoals is red rock, and the higher heads, one of which is covered by 4 fathoms water at low tide, are mushrooms of coral. Large vessels should keep clear of these shoals, especially if there is any swell. *Althea* bank could *not* be *found*, although the *Bourayne* passed over the position given it in the Sailing Directions several times.

26.—China.—East Coast.—*Yangtse-Kiang.—Wusung River Entrance.—Alterations of Lights and Buoys.*—The foundation of *Lismore* wreck lighthouse having been removed, *Wusung outer bar light-vessel* has been shifted to the site of that lighthouse; one cable southward of her former station. Also the following alterations have been made in the light exhibited on the *west side of Wusung river entrance:*—The light (*fixed*) now shows *white* from the river bank north-west of the lighthouse to the bearing of S. 2° W.; *green* between the bearings S. 2° W. and S. 59¼° W.; *white* over the navigable channel of the entrance between S. 59¼° W. and S. 72¼° W.; and *red* between S. 72¼° W. and the opposite bank of Wusung river. *Variation*, 2¼° *W.*

Also the following alteration has been made in the position of *Wusung outer bar buoy:*—This buoy (*red* and *black* in vertical stripes) on the western side of Wusung river entrance, has been moved one cable eastward of its former position.

Note.—Wusung outer bar is subject to frequent changes, but at present (August, 1878) the deepest water will be found from half a cable to one cable northward of the bar light-vessel.

27.—Japan.—*Meac-Sima-Group.*—Commander G. H. Perkins, U.S.N., reports that this group appears clear of hidden dangers and safe to approach from all directions except from the north-eastward, in which direction a reef extends about 3 miles from a rock lying east-north-easterly, about ½ mile from the N.E. point of

Taka-Sima. This reef appears to run N.E. about 1¾ miles (curving slightly to the southward), and thence N. ½ W. about 1¼ miles to a point distant about 2¾ miles from the N.E. point of Taka-Sima, and bearing from the latter about N.E. by N. A boat from the *Ashuelot* was sent to examine this reef, and two uncovered rocks were found lying, one about 3 cables off the N.E. point of Taka-Sima, and the other about 1½ cables outside the first, bearing E.N.E. from the N.E. bluff of Taka-Sima. Between these rocks, and between the first and the island of Taka-Sima, soundings were taken by the boat, but no bottom found at 20 fathoms. The reef is marked by strong tide-rips extending from the outer of the two rocks above mentioned, to which the southern extremity of the reef appears to be joined, along its entire length to its north point. Native fishermen stated that between the reef and the north end of Taka-Sima the soundings vary from 10 to 70 fathoms (very irregular), and that between the N.E. point of Taka-Sima and the first rock lying E.N.E. from it there is a passage with a depth of 70 fathoms. An islet, represented on the charts to lie 1 mile N.W. by N. from Taka-Sima, was found to lie only 2 cables from that island, and about 1 cable S.W. from the islet is a rock. In the passage between Taka-Sima and the island next to S.W. of it, an uncovered rock was found to lie a little south of mid-channel, and in the passage between this rock and Taka-Sima no bottom was found at 20 fathoms. About ¾ of a mile south of the rocks immediately off the S.W. end of Kusa-Kaki is a double-headed rock, well above high water, which would be dangerous to a vessel navigating near these islands in thick weather. The passage between this rock and the rocks near the S.W. end of the island appeared to be clear. The *Asheulot* passed through several times, but saw no indications of hidden dangers, and found no bottom at 80 fathoms. Close to shore, on the west side of Kusa-Kaki, are two rocks which uncover at low water. South of Taka-Sima there is an *anchorage* in from 30 to 40 fathoms, bottom of rock, gray sand, broken shells, coral, and pebbles, which furnishes a lee during northerly winds; in a gale, however, there would be a heavy swell, and the holding-ground is not good. The *South peak* of Taka-Sima was found by

barometric measurements to be 618 feet high, and the north peak is a little higher. *Variation*, $3\frac{3}{4}°$ *W.*

28.—Japan.—*Vincennes or Pallas Rocks.*—The boats of the *Ashuelot* passed between and around the rocks forming this group, but saw no signs of hidden dangers. Soundings were taken with the following results:—$1\frac{1}{2}$ cables S.E. of the North rock 75 fathoms; and $1\frac{1}{2}$ cables S.E. of the South rock 80 fathoms; bottom of gray sand and broken shells. Position of South rock, by good observations, lat. 32° 13′ 12″ N., long. 128° 4′ 39″ E.

29.—United States.—*Virginia.—Change of Light at Naval Hospital Wharf, Elizabeth River.*—This light is now exhibited from a mast 45 feet in height, erected 60 feet to the north of the former light station, and the light is changed from *fixed white* to *fixed red.* The bearings and distances will remain substantially the same as those of the former light. The old structure will stand as a day-mark.

30.—United States.—*Long Island Sound.— Light on Race Rock.*—The new structure stands on Race rock, off the western point of Fisher's island, north side of the entrance to Long island sound. The light shows alternate *red* and *white flashes* at intervals of *thirty seconds*, with short periods of total eclipses; elevated 68 feet above low water, and visible 14 miles. The lighthouse consists of a dwelling and tower resting on a circular granite pier, with a rectangular landing-wharf. The tower is square at the base, octagonal above, and is surmounted by a lantern painted black. A *fog-bell*, struck by machinery, will be sounded during foggy weather, giving *two blows* in quick succession *every twenty seconds*. Approximate position, lat. 41° 14′ 35″ N., long. 72° 02′ 51″ W.

31.—United States.—*New York.—Stratford Shoals Light-Station, Middle Ground, Long Island Sound.*—This light is now *flashing white*, at intervals of *fifteen seconds*, instead of flashing red and white at intervals of thirty seconds.

32.—Canada.—*Bay of Fundy.—Machias Seal Island, Alterations in Eastern Light.*—This light, exhibited from a tower recently erected, to replace the Eastern lighthouse on Machias Seal island, is a *fixed white* light, elevated 66 feet, and visible 14 miles. The

lighthouse, 53 feet high, octagonal in shape, built of wood and painted white, bears S.E. from the West lighthouse, distant 64 yards. Position as given, lat 44° 30′ 5″ N., long. 67° 6′ 15″ W.

Note.—Machias Seal island lights in line bearing N.W., lead about 4 miles seaward of Murr ledges.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, 1878.

No. 41.—WEST INDIA PILOT, Vol. II., Notice 5; Jamaica; information on Black river and Dry harbour.

No. 42.—EASTERN ARCHIPELAGO, Notice 17; information relating to Balabac strait, Sulu sea, Macassar strait, and Gillolo passage.

No. 43.—WEST INDIA PILOT, Vol. II., Notice 6; information relating to Puerto Rico and Cuba.

No. 44.—PACIFIC OCEAN, Notice 44; information relating to islands in the western part of the South Pacific.

POSITION OF COLOURED SIDE-LIGHTS.—Our excellent contemporary, the *Shipping and Mercantile Gazette*, in an otherwise useful article on the subject of the position of side-lights, makes a statement, which, if not contradicted, is likely to cause much trouble and delay. Our contemporary (December 3rd) informs his readers that the Board of Trade Surveyors "are instructed to see that the lights and screens of lading vessels are fixed on the shrouds of the fore-rigging." Our contemporary has omitted the word "not."

INCORRECT CHART.—We think it right to caution our readers against an incorrect chart. We refer to the last edition of the chart issued by the Admiralty for the entrance to the Baltic, The Sound Sheet No. 2. It is in error by one point variation westerly. Master mariners navigating by this chart will get their ships ashore unless they first correct it.

OUR OFFICIAL LOG.

[It will be seen from the following that the discussion on the subject of "Watch and Watch" initiated in our columns is likely to bear good fruit. We hope to be enabled to refer again to this matter before long.—Ed. *N.M.*]

Opinions of the Local Marine Boards as to whether a Third Mate may Legally and Properly be Allowed to take Charge of a Watch.

Aberdeen.—That there would be no impropriety or illegality in allowing a third mate to take charge of a watch on board ship provided he be in possession of a second mate's certificate or a certificate of a higher grade.

Belfast.—That if by a third mate is meant an uncertificated person the master would be responsible; sometimes certificated officers are styled third and fourth mates, and in that case such officers would be responsible, but not otherwise.

Bristol.—See no objection to allow a third mate to take charge of the bridge equally with the first and second officers, provided only that the third mate be possessed of at least a second mate's certificate of competency.

Cork.—See no illegality or impropriety in the establishment of the three watch system, provided the third officer is in possession of a certificate of competency for at least the grade of second mate, and that (outside the engine room department) the system be not extended beyond the responsible officers.

Dublin.—That it would not be either improper or illegal to allow the third mate to take charge of the bridge equally with the first and second officers, provided he holds a certificate of competency as second mate and the ship is in the open seas, but not when in crowded or pilotage waters.

Dundee.—Feel that they are not in a position to give an opinion on the point submitted.

Greenock.—That they see no objection to the practice in question if the third officer holds a certificate of competency.

GLASGOW.—Consider that the proposal would be a dangerous innovation to carry out.

HULL.—That there appears to be no objection, legally or otherwise, to a competent third mate, holding a second or higher grade certificate, taking charge of a watch or of the bridge in a steam ship if the Charter approved the same.

LEITH.—That if the third mate holds a certificate of competency they see no objection to his having charge of the bridge.

LIVERPOOL.—That there is no objection to a third officer taking charge of a watch, providing he holds a certificate of competency.

LONDON.—That, as in most steam vessels the third mate is the holder of a certificate as second mate, or of a higher grade, the custom in such cases would be perfectly legal. In cases where the third mate did not hold a certificate the master, knowing the responsibility incurred by placing such officer in charge of the bridge, would be careful to select an experienced seaman, which, in the opinion of the Local Marine Board, would in itself be proper, but they doubt whether in the event of accident the master would be exonerated.

NEWCASTLE.—Provided the third mate is a certificated officer they have no objection to such a system. Upon the legal phase of the question they can express no opinion, such being, in their view, more a matter for the Crown lawyers than for a Local Marine Board.

NORTH SHIELDS.—That where a third officer holds a certificate from the Board of Trade they see nothing improper in his taking charge of a watch, but think it undesirable that a ship's company should be divided into three watches.

PLYMOUTH.—That if the third mate held a second mate's certificate, or has had three years experience of sea service, he should be allowed to keep a watch, so as to make three watches instead of the old watch-and-watch system, but not otherwise.

SOUTH SHIELDS.—Think it would be highly improper to allow a third mate to take charge of the bridge at night from sunset to sunrise, or in thick weather, or in narrow navigation, but see no objection to a third mate taking charge in the daytime in the open sea, at a distance from a coast, and can offer no opinion as to the legality of the practice.

SUNDERLAND.—That there can be no objection to three watches of officers if the third mate holds a certificate of competency.

THE THAMES TRAFFIC COMMITTEE.

In the House of Commons, on Friday, the 13th of December, 1878, Mr. GOURLEY asked the President of the Board of Trade "What measures he has in contemplation for the better security of life and property in the navigation of the Thames and other large rivers: And, whether it is his intention to give effect to any, and which of the changes suggested by the Commissioner's Court of Inquiry respecting the collision between the steamers *Princess Alice* and *Bywell Castle?*"

Lord SANDON said: "We are giving our most careful attention to the whole question of the traffic regulations as to the navigation of the Thames, which is in a totally different position from any other river as to the authorities which are responsible for the management, and as to the condition of its traffic. I have referred the report of the Wreck Commissioner's Court to the very able committee which I appointed during the autumn to consider the Thames traffic regulations. Until the first report of that committee is received, and we have had the opportunity of considering it, together with other information which throws light upon the subject, it is not possible for me to say what course the Government will propose to take next year. We have laid upon the table of the House the evidence which the committee have already taken, with the view of bringing before Parliament the points which have been already raised, and of thus enabling other evidence to be offered to the committee if in any quarter there should be a desire to do so. I shall present to Parliament all additional evidence as well as the committee's report, on this important subject. (Hear, hear.)"

OFFICIAL INQUIRIES AT HOME, 1878.

(*This List is competed to the* 18*th of each Month.*)

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818. *St. Clair*, s.s.; iron; built at Dumbarton, 1876; owned by Andrew Ross and others, of Glasgow; tonnage 184; Tyne to

Glasgow; passenger and general cargo, and cattle, &c.; canted over on her side at Salen Pier, Loch Sunart, September 25, 1878. Inquiry held at Glasgow, November 12, 1878, before Millar and Coulborn, J.P. Forster and Ward, N.A. Master exonerated from blame, and certificate returned.

319. *Maria*, schooner; built at Granton, 1861; owned by Mr. Hickman, Hull; tonnage 87; Lyme Regis to Leith; lime; took the ground upon Boulmer Rocks, October 6, 1878. Inquiry held at South Shields, October 24, 1878, before Yorke, Stip. Mag. Pickard and Wilson, N.A. Master to blame for not verifying the mate's statement when he reported a light. Certificate suspended for three months.

322. *Thomas*, brig; built at Whitehaven in 1800; owned by William Kelly and others of that port; tonnage, 186; Charleston to U.K.; resin; abandoned at sea 40 miles east of Charleston, September 26, 1878. Inquiry held at Liverpool, November 6, 1878, before Raffles, Stip. Mag. Harris and Powell, N.A. Court found the master justified in abandoning the vessel. Certificate returned.

323. *Essex*, s.s.; iron; built at Hull, 1869; owned by Bailey and Leetham; tonnage, 1,183; Pillau to Hull; engines disabled about 160 miles from Spurn Head, September 13, 1878. Inquiry held at Hull, November 7, 1878, before Twiss, Stip. Mag. Knox and Ravenhill, N.A. Chief engineer guilty of negligence. Reprimanded.

326. *Esther Smeed*, barque; owned by George Smeed, of Sittingbourne; tonnage, 519; stranded on the island of Gottska Sand, September 30, 1878. Inquiry held at Westminster, November 15, 1878, before Rothery, Wreck Commissioner. Pickard and Nicolas, N.A. Master and mate both to blame for negligent navigation. Certificates suspended for twelve and six months respectively.

327. *Macedon;* wood; built at Quebec, 1866; owned by Robert Richardson, of Gateside, Paisley; tonnage, 1,237; Quebec to Greenock; timber; death of a seaman caused by the shifting of the deck load, in consequence of taking a very heavy sea on board. Inquiry held at Greenock, November 9, 1878, before

Neill and Ross, J.P. Grant and Nicolas, N.A. Master entirely exonerated from blame.

327. *Margaret Boyd;* wood; built in the United States, 1854; owned by Hugh Boyd, of Ardrossan; tonnage, 420; Miramichi to Ardrossan; deals, &c.; abandoned at sea by master and crew, but afterwards taken charge of and brought safely into port by the third mate of the s.s. *Ohio*, which vessel took the crew and master off. Inquiry held at Glasgow on November 9, 1878, before Coulborn and Hamilton, J.P. Forster and Ward, N.A. Master exonerated from blame. Mate's certificate cancelled for not aiding the master when the crew were in a state of mutiny. The mate, boatswain, and one seaman ordered each to pay £5 towards costs of the inquiry.

331. *Victoria;* wood; built at Shoreham, 1859; owned by A. Buckwell, of Brighton; tonnage, 272; bound to Trinidad; coals; stranded on the Cannon Rock, county Down, October, 18, 1878. Inquiry held at Belfast, November 12, 1878, before Orme, Stip. Mag. Holt and Castle, N.A. Master guilty of careless navigation in leaving the deck in charge of an inexperienced person when in close proximity to a dangerous part of the Irish coast. Certificate suspended for three months.

333. *Ely Rise*, s.s.; iron; built at Sunderland, 1878; owned by Hurley and Mathew, of Cardiff; Cardiff to Tybee; water ballast and patent fuel; stranded on Hats Rock, Crow Sound, Scilly. Inquiry held at Cardiff, November 23, 1878, before Jones, Stip. Mag. Aplin and Castle, N.A. Casualty due to reckless navigation on the part of the master in attempting to take his ship into the anchorage without a pilot. Certificate suspended for six months.

335. *Enterprise;* wood; built at Quebec, 1875; owned by the Arvon Shipping Company, Limited, of Carnarvon; tonnage, 1,494; London to Cardiff; ballast; stranded on Hope Point, near Kingsdown, October 26, 1878. Inquiry held at Westminster, November 16, 1878, before Rothery, Wreck Commissioner. Grant and Beasley, N.A. Master exonerated from blame, as was the master of the *Scotia*, the vessel which was towing the *Enterprise*.

337. *Celurca*, barque; built at Montrose, 1870; owned by

Robert Gibbons and others; tonnage, 356; Alloa to Demerara; coals; stranded on the Middle Cross Sand, North Sea, October 28, 1878. Inquiry held at Yarmouth, November 14, 1878, before Bracy and Brown, J.P. Harris and Hight, N.A. Charges made against master not proved. Certificate returned.

338. *Leader;* schooner; built at Bideford, 1858; owned by Messrs. Bate and Curtis; tonnage, 99; Randees Cattegat to London; barley; abandoned in the North Sea, but eventually salved by fishermen, October 29, 1878. Inquiry held at Westminster, November 14, 1878, before Rothery, Wreck Commissioner. Pickard and Nicolas, N.A. The Court decided that the shifting-boards were insufficient in depth, but that otherwise the cargo was properly stowed, and that the abandonment was not wholly unjustifiable. Master's certificate returned.

341. *Helena* and *Electryon;* the former a schooner, built at Aberyswith, 1862; owned by Richard Lumley, of Aberdovey; tonnage, 98; Duddon to Middlesbro'; iron ore; the latter a brigantine; built at Prince Edward Island, 1862; owned by R. H. Randall and R. Cooper; tonnage, 190; Yarmouth to Newcastle; ballast; in collision 7 miles south of Newarp light, November 9, 1878; one life lost. Inquiry held at Westminster, November 27, 1878, before Rothery, Wreck Commissioner. Harris and Holt, N.A. Master of *Electryon* in default in not having kept a proper look-out, and in not having taken proper and active measures to save those on board the *Helena*. Certificate suspended for three months.

Official Inquiries Abroad.

Albert Edward, Prince of Wales; put into Port Elizabeth, leaky. Inquiry held at Port Alfred, September 5, 1878. No blame attached to master or mate.

Britannia, ketch; lost at the entrance of the Nambuccra River. Inquiry held by Marine Board of New South Wales, September 9, 1878. No evidence to found charge against master.

Melrose, barque; stranded on the beach, near Timaru, New Zealand, September 1, 1871. Inquiry held at Timaru, September 11, 1878. No blame to be attached to officers and crew.

Toronto, brigantine; stranded near Beak's Bay, Bahamas, August 24, 1878. Inquiry held at Nassau, September 19, 1878. casualty not attributable to carelessness on the part of the master, officers or crew.

Star Queen, barque; stranded on the Sisters' Reef, July 29, 1878. Inquiry held at Freemantle, September 8, 1878. Stranding due to negligence on the part of the master. Certificate suspended for three months.

Southport, barque; stranded at Durban, August 23, 1878. Inquiry held at Durban, September 21, 1878. Master in default, but not sufficiently culpable to warrant suspension of his certificate.

Napier, s.s.; lost at Port Campbell, September 16, 1878. Inquiry held by the Steam Navigation Board of Victoria, September 25, 1878. Master committed an error in judgment; cautioned to be more careful in future.

Atlantic, barque; beached in Trial bay, N.S.W., and afterwards became a total wreck. Inquiry held at Sydney, September 23, 1878. No evidence on which to found a charge against master.

Mary Grant, brig; beached to the north of Newcastle, N.S.W., September 25, 1878. Inquiry held at Newcastle, September 27, 1878. No evidence on which to find a charge against master.

Stranger, barque; burnt and abandoned at sea, September 26, 1878. Inquiry held at Port Elizabeth, October 23, 1878. Fire arose from spontaneous combustion. Master exonerated from blame.

Eudora, barque; lost her rudder by grounding near Cape Pacific, August 30, 1878. Inquiry held at Port Elizabeth, October 8, 1878. Master censured and cautioned. Certificate returned.

Furness Abbey, ship; lost at Galle, and inquiry held there. Casualty due to the misconduct and drunkenness of both master and mate. Certificates suspended for *two* years.

Mary E. Goodwin, ship; abandoned at sea. Naval Court held at Antwerp, November 7, 1878. Abandonment justified. Evidence conflicting as to whether she was overloaded.

Princess Royal, schooner; stranded on the Lofgrunde Shoal, August 19, 1878. Inquiry held at Stockholm, November 11, 1878. Casualty occasioned by the default and negligence of master. Certificate suspended for twelve months.

THE

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THE THAMES TRAFFIC COMMITTEE.

THE Committee appointed by Lord Sandon to consider the Rules for regulating traffic in the Navigation of the River Thames, have issued a preliminary report, to which the minutes of evidence taken up to the 5th December last are appended. The report is as follows:—

"Before attempting to form an opinion on the general subjects which your lordship has referred to us, we have found it necessary to receive evidence from a considerable number of persons representing the various interests on the Thames. The different and in some respects conflicting views expressed by these witnesses raise a number of special points connected with the navigation of the river; and it appears to us desirable that these different views should be brought to the notice of the public and of those interested as soon as possible.

"We have therefore thought it right to submit the evidence we have taken.

"In the meantime we are continuing to take further evidence, which will accompany our report.

" (Signed)	" T. H. Farrer,	Thomas Gray
	R. Collinson,	W. C. Morgan,
	F. W. E. Nicolson,	D. Murray."
	Robt. B. Batt,	

Lord Sandon's reference to the Committee reads as follows :—

" . . . To be a committee to consider the rules now in force, and to report to their lordships whether any, and if any, what, fresh regulations are necessary with a view to preventing collisions, and for regulating traffic in the navigation of the river Thames, bearing in mind the special points following; that is to say, the Rule of the Road; the lights to be carried; the use of signals; the speed of steamships; the necessity or otherwise for alteration in the regulations concerning the number of passengers carried by steamships in such waters, and as to appliances to be provided for saving life in cases of emergency, and the hours during which passengers should be carried in river steamers; and generally to report whether and in what manner further provision can be made for better securing the safety of human life upon the river; stating with whom the responsibility now rests for making and carrying into effect the regulations for that object; and whether any alterations appears to be desirable in the distribution of the work amongst the authorities or officers now charged with it."

Our readers will remember that Lord Sandon's Committee were appointed immediately after, and in consequence of the deplorable loss of life resulting from the collision which occurred between the saloon steamer *Princess Alice* and the screw collier *Bywell Castle*, in rounding Tripcock Point, on the night of the 3rd September last. They will also remember that the collision referred to was declared by the Court of Inquiry to be the outcome of an utter want of system in the navigation of the Thames, and that though the Conservators of the River had adopted bodily the rules issued by the Board of Trade for preventing collisions at sea, sufficient pains had not been taken to make known or enforce those rules, and that practically the entire navigation of the Thames is carried on by rule of thumb.

The comprehensiveness of Lord Sandon's reference to the Committee indicated that the terrible circumstances attending the *Princess Alice* collision only brought to a climax the general dissatisfaction existing with regard to the management of the river traffic, but the evidence elicited by the Committee reveals a state

of things which it would be hard for anyone unacquainted with the river to realize.

From Teddington Lock to Lower Hope Point the Thames is at present under the joint control of the Conservators of the River and the Watermen and Lightermen's Company, which have Acts of Parliament confirming their authority, and entitling them to frame bye-laws for the regulation of the traffic and the protection of their own interests. The Board of Trade, the Trinity House, and the Thames Police are also possessed of certain limited powers in the River; but the Conservators and Watermen's Company are entirely responsible for the navigation.

The Watermen's Company have the exclusive right of licensing watermen and lightermen to ply within the limits referred to above, viz., Teddington Lock to Lower Hope; but vessels from westward of Teddington Lock, and vessels from eastward of Lower Hope Point may enter and leave the Port of London without icensed men on board, provided that they do not ply entirely between places within the limits. The effect of this regulation is that all the river steamboats must be commanded and manned by licensed watermen, who are, as a rule, unacquainted with sea service or the Board of Trade Rules for preventing collisions at sea. These Rules, as already pointed out, have been adopted *en bloc* by the Thames Conservators, but since their adoption in 1872 very little has been done to make them known to watermen and pilots.

It follows, therefore, that the master of a river steamboat, who does not happen to hold a Board of Trade certificate, may be in utter ignorance of any rules for his guidance when a collision is imminent.

An exempt pilot named Langman gave the following remarkable evidence :—

Q. "But if the rule is that you shall port, why is the extra light required to show that you are going to do what the rule says you shall do ?—A. The mischief seems to me to be that when we meet one another we do not know what each of us is going to do. There always seems to be a misunderstanding between two ships approaching each other.

Q. "Do you mean that there is a doubt whether you will act on a rule or not?—A. That is it.

Q. "But if you do act upon the rule, you do not want a signal to say that you will act upon the rule?—A. We have never known that there has been a rule upon the Thames until lately.

Q. "How long have you known it?—A. Only a month.

Q. "You never knew until last month that there was a rule of the road on the Thames?—A. No; and I do not think that others knew it.

Q. "Do you not think it better that everybody should know the rule, and should act upon it, instead of having additional lights to indicate to another ship what you propose to do?—A. I think so. If the Thames Conservancy frame rules and do not make them known to pilots and others, how are we to know that they frame them?

Q. "Is there not at Gravesend a sort of office where pilots wait and congregate, and so on?—A. Yes, on the Terrace Pier.

Q. "Is that where the rules of the pilots are to be found?—A. Yes.

Q. "Are you aware that the harbour master at Gravesend constantly keeps the pilots there informed of the rules and by-laws of the Thames Conservancy?—A. I am not.

Q. "Are you aware that the Thames Conservancy have distributed about 2,000 copies of those rules since they were enacted?—A. Many, like myself, were quite surprised that there were any rules of that kind.

Q. "You never heard of an end on rule before?—A. No, not in the river."

It does not appear very wonderful after reading the above evidence that the *Princess Alice* collision occurred, or that it was deemed necessary to appoint the present committee.

The remedy proposed by the Thames Conservators to meet the case of vessels rounding points, like the *Princess Alice* and *Bywell Castle*, is a rule to the effect that "when the tide is running, and two steam-vessels are approaching each other preparatory to rounding a point, the vessel proceeding against the tide shall ease or stop, if necessary, until the other vessel shall have passed clear

of her." This rule is proposed to take the place of Art. 14 of the Steering and Sailing Rules, which is as follows:—"If two ships under steam are crossing so as to involve risk of collision, the ship which has the other on her own starboard bow shall keep out of the way of the other." The latter rule is as evidently unsuitable to steam-vessels rounding points over which their lights can be seen as the former is necessary in such circumstances under present conditions. Indeed, it was stated by the managing owner of the General Steam Navigation Company that after the collision between their vessels, *Ostrich* and *Benbow*, which happened near the place of the collision between the *Princess Alice* and *Bywell Castle*, an amendment embodying the proposal of the Thames Conservators was inserted in their own rules.

But the radical cure for collisions below the pool is contained in the suggestion that all traffic should be confined to two streams of vessels, the one going down on the Kentish side of the fairway, and the other coming up on the Essex side of the fairway. It is suggested as a more practical rule that the large class of steamers and large sailing vessels should keep in the deep fairway, passing each other invariably on the port hand, and that vessels of light draft should not be driven into the fairway, and only cross or navigate the fairway at their own risk.

If these regulations could be carried out they would go far to render serious collisions impossible, but unfortunately there are many difficulties raised by competent men to a hard and fast starboard rule being established. Captain Burstal, R.N., Secretary to the Thames Conservancy Board, pointed out that in a certain state of tide a vessel rounding a point would be caught on her starboard bow, and carried against her helm towards the wrong side of the fairway; that there would be great difficulty in designating the fairway, or at least the line which should divide the two streams of traffic; and that in some places, for instance off Broadness, a vessel of deep draft coming up the river would be obliged by the shoal to keep near the Kentish shore, whereas a vessel of light draft going down, would be under no such necessity, and would consequently pass the other vessel on the starboard side. There is also the objection that sailing

vessels driving or turning down, or barges drifting, would go with the tide, and so obstruct the navigation as to render the starboard rule impracticable. It is, however, suggested that nothing should be allowed to drift above Blackwall, but that everything should be under the command of sail or steam, or in tow. Here, however, the Committee meet with what appears to be two of their greatest difficulties in their regulation of the traffic from London Bridge downwards. The sailing barges hailing from the Medway, &c., are generally acknowledged to be well manned and thoroughly under command, and, with a few exceptions, ready to give way to a steamer when the latter intimates that she is unable to keep clear, as required by the Rule of the Road; whereas the dumb barges, which are as generally asserted to be a nuisance and badly managed, can only drift with the tide. The suggestion that dumb barges should be towed from Blackwall is, however, met with grave opposition from the barge interest, and we notice that at the annual meeting of the Kent Barge Owners' Association it was strongly condemned, the chairman naïvely remarking that the proposition was the outcome of the *Princess Alice* collision, in which barges played no part whatever, except in saving life from the unfortunate steamer. We have, however, pointed out above that the Committee is not so much the consequence of the *Princess Alice* collision as the climax of the increased danger and inconvenience which attend the increased navigation of the river. The bargeowners, we are convinced, will not permit any inconvenience they may at first feel, to rouse them to oppose the efforts of a Committee who are evidently fully alive to the interests of all classes concerned in the navigation of the river, and who would be reluctant to subject any class to permanent injury.

On the whole, the weight of evidence appears to be against a hard and fast starboard rule, but in favour of the re-establishment of the old starboard hand rule, at the same time reserving the deep-water channel as far as possible for vessels of deep draught of water, and the addition of a rule for rounding points.

A system of signals by whistle and lights to show the intention of steamers in passing sailing-vessels and other steamers, was recommended by some witnesses, but opposed by others on the

ground that any increase of such signals would be bewildering and frequently misunderstood. It was, however, pointed out that the suppression of unnecessary whistle signals, and the establishment of a system well understood, might prove beneficial.

The navigation of the river from London Bridge to Hookness seems to present the most serious difficulties. The sailing-barges and small craft, working up with the tide, are at Hookness joined by hundreds of dumb barges leaving the docks and drifting with the tide to their destinations at the various wharves on both sides of the river, and navigated by one, or at most two, lightermen, who are sometimes unable, and sometimes unwilling, to make way for the steamers and the large vessels in tow.

Steamers are of course obliged to run at a slow rate of speed in this part of the river, and very often to drive the barges before them until an opening presents itself. The inconvenience arising out of this chaotic navigation is very great, although not attended with much loss of life; and the obvious remedy is towing. But here the Committee have to deal not only with the interests of the barge-owners, but with the "vested" interests of the watermen and lightermen who navigate the barges. The origin of this vested interest is almost as curious as the qualifications the men are required to possess.

Q. "Your Company is a very old Company, and I notice that in the early Acts there were certain provisions named whereby freemen of the said Company were obliged to serve on board His Majesty's fleet under such circumstances, and subject to such penalties, as were therein mentioned. Is it not possible that some of these exclusive rights of the watermen and lightermen may have been granted originally in return for some idea of compulsory service?—A. I should think at the time those privileges were granted it was really in the war days, in order to make a provision for our navy; that is my idea of the meaning of it.

Q. "It was something for something?—A. It was something for something; you may depend upon that.

Q. "But the compulsory service is abolished?—Compulsory service is abolished.

Q. "So that now it is something for nothing?—A. Of course,

every young man who takes up his freedom takes his oath, and is compelled to take his oath to serve his Queen and country if called upon.

Q. "That oath continues, does it, although the obligation is gone?—A. Yes."

The qualifications required from the watermen and lightermen do not appear to be commensurate with the exclusive privileges they enjoy.

In answer to the Chairman, a witness stated that though some of the Watermen's Company's men are satisfactory, the majority of them are the most ignorant lot of men that it is possible to find. They are supposed to pass an examination before they obtain a license, but it is a very limited one indeed, and is held by the Warden and Court of Assistants of the Company, who are self-elected, so that, practically, the men who navigate vessels upon the Thames aro governed by themselves.

In answer, another witness admitted that the boy who drew corks on board the *Princess Alice* was a waterman's apprentice, and that his service in that capacity for two years would count as efficient service to enable him to become a lighterman.

A lighterman and barge builder, who appeared to have very decided opinions on the subject, stated as follows: "With regard to the examination by the Watermen's Company, they have no machinery; when they grant a license, two men sit at a table, and one or both of them knows very little about the whole matter; it is the payment of fees, and they ask you to show your hands, and the master gives a recommendation; they can get half-a-dozen men for half-a-dozen pots of beer to sign recommendations."

A Trinity pilot states that "the up-country people in command of sailing barges try to get out of the way of large steamers, but that the London lightermen of the Watermen's Company are the worst of the lot; there is no doubt about it, they are an obstinate set; they have the privilege, and they think they should keep it; they do not care about their master, if they get the sack from one they get a berth with the next one."

Besides the waterman's professional privilege, he has civil privileges, which possess a peculiar value to him. Among other

anomalies, it appears that if the public have a complaint against a waterman they must take it to the Court of the Waterman's Company, but if a waterman has a complaint against the public he takes them before the Lord Mayor.

It is further asserted that a lighterman does not lose his freedom, no matter how often he may have been convicted of felony and other offences, and that he looks very lightly upon dismissal, as the number of his body is so limited that he is practically sure of being taken on somewhere else the next day.

The bargeowners complain bitterly of their restricted choice of hands, and suggest that a license should be granted, after strict examination, to any qualified person who might offer. This suggestion would practically abolish the exclusive privileges of the Waterman's Company, as it would throw open the river to the men from the Western barges, and the men from the Kentish sailing barges, who are generally acknowledged to be competent hands.

On the other hand some witnesses, representing certain societies of watermen and lightermen, complained that the men were not represented upon the court of their Company, which was entirely composed of employers of labour, that the owners frequently register their barges at considerably under their carrying capacity in order to evade the Conservancy Bye-Laws requiring vessels of over fifty tons to have two men on board. One foreman of the Company, representing himself as the Secretary of the Watermen's and Lightermen's Association, and who stated that he had just returned from six years sojourn in America, astonished the committee with the statement that in the year 1866 there were 125 watermen drowned in the river owing to there not being a second competent man on board the barges. Mr. Fairbairn further stated that there were 1,500 freemen idle on the banks of the river.

On the part of the bargeowners and lightermen it is urged that the responsibility of pilots should be increased, but there seems to be very little inclination among bargeowners and lightermen to favour the suggestion of general towage.

We apprehend that the difficulties which present themselves in connection with dumb barges and lightermen are among the

most troublesome that the committee are likely to encounter. This short review of some of the evidence on which we venture to express no opinion will, we trust, be of use to those interested. We must again suggest to our readers that if they have any suggestions to make as to the rule of the road, ships' lights, or life-saving apparatus, they had better do so at once. They would have the advantage of laying their views before a committee not exclusively composed of Board of Trade officers, and ready to give earnest attention to any project or suggestion coming within the scope of their inquiry.

ON THE BENEFITS OF COMPENSATION BY MAGNETS FOR THE COMPASSES OF IRON SHIPS.

"The neutralization of the ship's polar force, *i.e*, the reduction of the semicircular deviation, by the introduction of an opposing magnet, necessarily allows the directive force of the earth to act equally on the ship's compass needle in all azimuths."—Capt. EVANS's *Elementary Manual.*

IN this paper I have used the term *compsnsating*, in preference to *adjusting*, in connection with the magnets used for the correction of the semicircular deviation, inasmuch as it appears to me to bring more fully before the mind the twofold duty which a magnet fulfils when employed to correct a needle deviating from the magnetic North; for, just as the compensating balance is of very great value to the chronometer under considerable changes of temperature, so, in like manner, are the compensating magnets of very great value (properly used) when the change of magnetic latitude is considerable; and this is particularly the case with regard to the needles of the steering compass, which (generally from its position) is more or less influenced by the induced magnetism of the vertical iron at the stern.

In this age, when some knowledge of the good properties of a magnet, used in correcting a deviating needle, is of primary importance to the person who navigates an iron ship, it has often surprised me to hear shipmasters speak doubtfully of the benefits

of compass compensation; and in a paper by "W. P.," which appeared in the *Nautical Magazine* for November, 1876, among some good hints respecting the tabulating of observations for future guidance, &c., will be found the following paragraphs :—

(1.) "With a change of place and of the magnetic dip, as well as with any considerable heel of the vessel, the deviation cards are sure to be more or less incorrect, and the change is always greatest in compasses adjusted with magnets." And the writer continues—(2.) "Moreover, in compasses corrected by magnets the error will vary with time under precisely similar circumstances, whereas, under such circumstances, the errors of an uncompensated compass remain constant; for this reason the standard compass should never be adjusted by magnets, but the needle left to be influenced by the attraction of the hull alone."

With regard to the first paragraph it only shows that masters of iron vessels should be able, on a great change of magnetic latitude, to re-correct the semicircular deviation by shifting the magnets according to the rules given by Sir G. B. Airy, and also by observations made during the voyage, determine approximately (by the use of the clinometer) the heeling error.

With regard to the second paragraph—presuming that change of place and dip or heeling error are not included under the head of "similar circumstances," and, excepting in the case of a new vessel on its first voyage, when the sub-permanent magnetism of the ship may, and probably will, lose some of its force, I have been taught to believe, and experience, extending over 13 years in iron ships in both hemispheres, has confirmed this belief, that afterwards the sub-permanent magnetism of a ship becomes so very near a permanent quantity, that for practical purposes we may reckon it as permanent. As an example of the small change in the sub-permanent magnetism of iron ships, even during long intervals of time, I may state that although the vessel I command was built on the Tyne nearly 20 years ago (being launched in 1859), and has undergone extensive repairs to the hull in Australia, yet its magnetism still plainly indicates the position in which it was built—head nearly south. Consequently I always found the heeling error very small in the northern

hemisphere, while here, in the southern, it amounts to $1\frac{1}{4}°$ of error for every degree of heel, leading the ship to leeward on both tacks, head northwards; and to windward on both tacks, head southwards.

And, with regard to the compensating magnets, I have never known them to lose any of their force during the lapse of even long intervals of time. I may state that in 1873, when I was correcting a compass by two fore-and-aft magnets, the distance from the compass needles at which they corrected a certain amount of deviation was registered; afterwards, on change of port and voyage, I had occasion to remove them, but on replacing them, when the vessel returned to the old port, I found the error of the compass was the same as it had been four years previously, and that at the old distance the magnets again corrected it. Then, if there is no change in the ship's sub-permanent magnetism, after having made a voyage or two, and no change in the force of the magnets, I think there is very little doubt but that the uncorrected, as well as the corrected, compass will show the same error after lapse of time, while the vessel is upright and in the same magnetic latitude.

There is one case in which the magnets will increase, instead of correct, the error of the compass needle, but this can only occur, to any great extent, on change from north to south magnetic latitude. I refer to the position of the steering compass of a vessel built head north, for such vessel would necessarily give a large *minus* B at the position of the steering compass, that is, an attraction of the north end of the needle to the stern. Now, a large part of this *minus* B would be due to the induced magnetism of the vertical iron at the stern, and would be larger in amount the nearer the compass was placed to such vertical iron. After the vessel had crossed the magnetic equator, the sign of the induced magnetism in the vertical iron would be changed, and if the compensating magnets were allowed to remain in their original position, such a compass must be largely over-compensated for high southern latitudes; but this only shows that the shipmaster should know how to shift the position of the magnets when required Doubtless a compass so placed is in a bad position, but so long as ships are steered aft, there must the compass be placed to steer by.

Speaking from experience, I have always found a compensated compass (taking care that it is not over-compensated) act better than an uncompensated one; and, whether steering or standard, if the maximum semicircular deviation exceed 5°, I would prefer to have it corrected; for there are certain parts of the world where an uncompensated compass, with a medium amount of deviation, would, from its inertia, become almost worthless for steering purposes; the Gulf of St. Lawrence in the northern hemisphere, and about latitude 52° S. longitude 120° E. in the southern hemisphere, are places where this would occur, for in each of these places we have the magnetic dip at 77° to 78°, and the earth's horizontal force (or the directing force acting on the needle) reduced to one-half the amount that it is on the magnetic equator, while, *especially* at the usual position of the steering compass, the ship's polar, or disturbing, force is largely increased; and it is under these circumstances that the compensating magnets become so valuable to the shipmaster, not only correcting the error, but also, by masking the ship's polar force, increasing the directive power of the needle.

I could give many instances of the utility of magnets to the shipmaster,—not to remain where they are placed by the compass adjuster in England, but, for the shipmaster to use them for re-adjusting, as required by Sir George Airy's method. I may state that since being in command of an iron ship, when bound to the southern hemisphere, the magnets have always been removed from the compasses on crossing the magnetic equator; and, as the south dip increased, and with it, the deviation, I watched the increasing error of the compasses, until the deviation became large, and the inertia of the compasses great; then by careful sun-azimuths, the magnets were again put down, and the deviation corrected. Some years ago, being bound to Australia in the summer months, I determined to take the composite great circle route, *maximum* latitude 52° S.; on January 21st, we crossed the meridian of Greenwich, in latitude 45° S., when I found the steering compass very inactive, and the maximum deviation had reached 10°; the ship had been built head about south, and had a *plus* B of nearly that amount, or about 9° to compensate from the sub-

permanent magnetism of the ship, and a portion of this 9° would arise from the induced magnetism of the vertical iron at the stern; this, as the dip increased, would necessarily increase also, and I corrected it by two fore-and-aft magnets, placed on the main-deck, under the binnacle, which was fixed on the after part of the deck-house, and stood some four feet six inches above the main-deck, the helmsman standing on a raised platform to steer. After being corrected the compass worked well for a few days; but as the ship proceeded to the S.E., the dip rapidly increased, and again the steering compass became inactive, and the deviation increased, until on January 29th, in latitude 50° S., longitude 35° E., with the dip at 63° the *plus* B had reached 8° more, making now 17° in all; and to correct this the ship's carpenter had to make two grooved pillars (with peg-holes an inch apart) reaching from the main-deck to the lower part of the binnacle; I moved the magnets upwards in these until the compass showed correct magnetic East, then fixed them, and again the compass did its duty well, having regained its activity, and the hand that had been required to stand tapping it was now dispensed with—a great relief to the seamen.

On February 9th, I had to move the magnets further upwards in the grooves, to correct the increased deviation, for, to use the crew's expression, "the compass was becoming *froze* again," alluding to its inactivity. On February 14th, in lat. 51° S., long. 110° E., with the dip at 77 degrees, the *plus* B had reached 27°, or 10° greater deviation than it had had 15 days earlier; again I moved the magnets upwards and corrected the deviation, having now placed the magnets 2 feet 6 inches nearer the card than they were 23 days before.

Now, with this B of 27°, if we assume the earth's horizontal force, or the directing force acting on the needle, as unity, we have the ship's polar force, *i.e.*, the disturbing force, as ·6, or about equal to $\frac{3}{5}$ths of the earth's force; and under these conflicting conditions how can we expect an uncompensated compass to act, for between the opposing forces, the uncompensated compass is in such a state of inertia that the north point is carried round as the ship's head moves in azimuth, and is absolutely worthless, whereas the compensated compass is restored to almost its normal condition, or it

acts (ship upright) as it would on shore clear of the influence of iron; and I have no hesitation in saying that but for the use of these magnets we could not have steered the ship by this compass at all; doubtless this compass was badly placed, but it was as far forward as the man could see to steer by it. Surely then, instead of deprecating the value of compass compensation, we, as seamen, ought rather to be grateful to such men as Airy for discovering the system; and to Towson, Smith, Rundell, Evans, and Rosser for their endeavours to bring its rules so plainly and clearly before us.

With W. P. I hold that sufficient care is very often not shown by compass adjusters in selecting the position of the standard compass; and this is especially the case on board vessels built head north or south, or near these points; but if these men shirk their duty sometimes—in many cases it is not their fault, for very often they have not the time allowed them to do their work properly—and the standard compass is badly placed by them, it still remains the shipmaster's duty during the voyage to seek a better position for it—that is, the place where it will show the least amount of deviation—always taking care that such position is not near to vertical iron of any description.

When masters of iron ships look more into these things for themselves, we shall have fewer vessels arriving in Australian ports with their magnets still in the position in which they were originally placed by the adjuster in England, and their compasses either considerably over, or under compensated, according to the position in which the vessel may have been built,—while the masters growl at the compasses and wonder why it is that they are either so sluggish or so erratic in their movements that they can scarcely steer by them; they either do not know, or they forget, that in this part of the world, on the south and S.E. coasts of Australia, we are at the magnetic antipodes of England, having the south dip at 66° to 68° against 68° north dip at London.

MARSHALL SMITH,
Master Extra.

Newcastle, N.S.W.,
September 9th, 1878.

[We are always pleased to receive such intelligent communications from our correspondents; we are also glad to see

that the compass and its deviations are receiving a much greater amount of attention than formerly, and this notwithstanding the defectiveness of the examinations on the subject. As regards compass adjusters not placing the standard compass, or any other compass, in the best possible position, we fear they have little to do with it; the deck arrangements are settled in the builder's office, the builder (by contract) finds the compass, he has it fixed in the pre-arranged part of the ship, *and the compass adjuster is then called upon to fulfil his office as best he can*, without disturbing the order of things. This system is not the right one, and we suspect that much of the ill-fame attaching to the compass has arisen from this mode of proceeding. We also hear that, compass-adjusting being voted a nuisance by shipowners, brokers, pilots, tugmasters, &c., ships are, if possible, recklessly dispatched without the attention the compasses should have.—Ed. *N.M.*]

TONNAGE OF DANISH VESSELS.

WE have received a copy of an exceedingly well-got-up and clear book on the subject of Tonnage, issued by the Department in Copenhagen which has to perform most of the duties there performed by the Marine Department of the Board of Trade in London; and we cannot speak in terms too high of the completeness, care, and accuracy with which the Danish officer has performed the very difficult task allotted to him in the preparation of his valuable work. The Moorsom system is, as our readers know, the system on which all tonnage measurement is founded throughout the world. In the United States of America that system is adopted in its most simple and complete form. It includes the entire gross measurement of the ship, and no deduction whatever is allowed for engine room or crew space. This one practical fact is a complete answer to the theoretical views expressed in this country that the system of gross tonnage is impossible, or if possible, is unjust. The truth is, the British shipowner, and the

shipowner in other European countries, following the lead of England in order to *encourage* steamers, induced their legislatures to deduct space for propelling power, and thus adopt a lower tonnage for steamers than for sailing vessels. There is no justice and no principle in such a deduction, and it is only because the steam shipping interest obtained the concession (when steam was young, and, it was thought, needed undue encouragement) and have been allowed to retain it so long, and because dock dues are levied, to a great extent, without taking "time" into consideration, that the steam shipowners cling to their exemptions. No one can say that light dues should not be levied on the gross tonnage, for lighthouses are of service to the whole ship, to that containing engines, and boilers, and coal, as well as to that containing cargo. However this may be, the United States alone keep to the system of gross tonnage pure and simple, while the European powers "favour" the steamship to the prejudice of the sailing ship, by allowing deductions for propelling power.

The whole difficulty of the tonnage arises out of the method by which the deductions are to be allowed. The injustice of allowing a deduction at all remains; but, assuming that that injustice will continue to exist at any rate for a time, the European Powers have agreed in the case of steamers using the Suez Canal and the Danube to certain rules whereby the deductions (though wrong in principle) shall be made in the same manner in all ships; and have agreed as amongst themselves, and in order to obviate remeasurement in the ports of each other country to a set of rules for deduction which, though not actually identical, are so nearly identical as to be practically alike. The method of arriving at these deductions in Danish ships is fully explained in the book before us; but before we refer to it we may explain, for the information of our non-professional readers, that the register ton is 100 cubic feet of space, and is not a measure of weight, and that the gross tonnage of decked British ships includes the measurement of the following spaces:—

(*a*.) The space under the second deck from below, or the upper deck if there is only one deck.

(*b*.) The spaces between all decks above the second deck.

(*c.*) The permanent spaces, if any, on or above the uppermost deck of the ship (whether she has one or more than one deck) which are closed in so as to be available for stores, crew, passengers or cargo, other than deck cargo:

(*d.*) All uncovered spaces on deck occupied on any voyage by cargo.

The tonnage of the spaces included in *a*, *b*, and *c* above are the gross register tonnage as stated in the certificate of registry; whilst *d*, the tonnage of the space occupied by deck cargo, is not stated in the certificate of registry, but is ascertained every voyage.

The spaces altogether disregarded in measurement of British ships, and therefore not even included in the gross tonnage, are

(1.) Spaces on the upper side of the uppermost deck, which, though they may be covered over, are not inclosed so as to be available for stores, crew, cargo, or passengers.*

(2.) Spaces on deck or above the tonnage deck, cased in for air, light, ventilation, or mere access to engine and boiler space, or to cabins.

(3.) Spaces on deck, inclosed to cover boilers and engines, merely used for weighing anchor, hauling and furling sails, pumping holds, distilling fresh water, &c., totally unconnected with the propelling power and not used for stores.

(4.) Privy accommodation for the use of the crew.

(5.) Hatchways above deck when they do not exceed one-half per cent. of the gross tonnage.

The spaces included in the gross tonnage and afterwards deducted therefrom are

(*a.*) Certified berthing accommodation for sole use of the crew when it is properly constructed, lighted, ventilated, drained, and shut off from odours frombilge water or cargo, and is not used for cargo stores or anything else. This provision, which is a piece of special legislation, is entirely with a view to the health and comfort of the crews of ships.

* If they merely shelter *deck* passengers, the Board of Trade have power to exempt them specially.

(*b.*) Mess-room, or mess-rooms, solely for the crew.

(*c.*) Bath-rooms solely for the crew.

The deduction for engine-room is governed by the following Rules:—

"(*a.*) *To be rateable in ordinary Steamers.*—As regards ships propelled by paddle-wheels, in which the tonnage of the space solely occupied by and necessary for the proper working of the boilers and machinery is above twenty per cent. and under thirty per cent. of the gross tonnage of the ship, such deduction shall be thirty-seven one-hundredths of such gross tonnage; and in ships propelled by screws in which the tonnage of such space is above thirteen per cent. and under twenty per cent. of such gross tonnage, such deduction shall be thirty-two one-hundredths of such gross tonnage.

"(*b.*) *May be measured where the space is unusually large or small.*—As regards all other ships, the deduction shall, if the Commissioners of Customs and the owner both agree thereto, be estimated in the same manner; but either they or he may in their or his discretion require the space to be measured and the deduction estimated accordingly; and whenever such measurement is so required the deduction shall consist of the tonnage of the space actually occupied by or required to be inclosed for the proper working of the boilers and machinery, with the addition in the case of ships propelled by paddle-wheels of one half, and in the case of ships propelled by screws of three-fourths of the tonnage of such space."

The gross tonnage of decked Danish ships includes the measurement of the following spaces:—

Rules respecting the space on the upper deck which is to be included in the gross tonnage, as well as the space on or under the upper deck which is to be deducted, to ascertain the net tonnage of the ship.

A.

(*a.*) The gross tonnage (total number of tons) of a sailing vessel is to be ascertained by adding together—

1. The number of tons of the space under the tonnage deck.

2. The number of tons of the spaces between the tonnage and upper deck.

3. The number of tons of the closed-in spaces above the upper deck.

(*b.*) A sailing ship's net tonnage (register number of tons) is ascertained by deducting from the gross tonnage the number of tons of the space or spaces which are used for the lodging or requirements of the crew, or to navigate the ship, so far as they carry out the rules laid down for such deduction. In cases where no deduction can be allowed, the net tonnage of a ship is the same as her gross tonnage.

The net tonnage of a steamer is ascertained by deducting from the gross tonnage not only the number of tons of the space or spaces which are used for the lodging or the requirements of the crew, or for navigating the ship, as far as they carry out the rules laid down for such deduction, but also the number of tons of the space or spaces which are taken up by or are necessary for the propelling power.

(*c.*) The statement of measuring, added to the nationality and register certificate, shall contain information of the number of tons, and a description of each separately measured space, which has been included in the gross tonnage, as well as the number of tons, and the description of each separately measured space, which is deducted from this tonnage in the statement of net tonnage.

The measurement of the ship shall always be given in cubic metres, which are ascertained by multiplying the number of tons by the factor 2·83; whilst, on the other hand, the reduction of cubic metres to tons is done by multiplying the former by the factor 0·353.

(*d.*) If any space, the number of tons of which has been deducted in the gross tonnage, is found to be used for the lodging or requirements of passengers, or for the captain of the ship, or to carry freight, provisions, or necessaries for the ship, the captain of the said ship, or the proprietor, will be called upon to answer for it in accordance with the law of ship's measurement of the 13th of March, 1867. Sec. 23 (Comp. Sec. 16).

B.

The rules given in the instructions for the measuring of ships, of the 7th of September, 1867, Section V., respecting the measurement of spaces on the upper deck, which are to be measured and included, or deducted from the same, together with the regulations for the measuring of raised hatches, &c., as also the rules given in part *b*. of the circular, No. 5 of ship's measurement, of 18th of May, 1872, respecting the treatment of the so-called over or protection decks, *are abolished*, and in their place the following rules must be followed in every new measurement or re-measurement on and after 1st October, 1878.

C.

Spaces that are to be included in the gross tonnage:

All closed and fixed spaces (such as half-decks, cabins, poops, forecastles, hatches, or holds), on or over the upper deck, whether this is an ordinary deck or an over deck, as well as the space between the last-named deck and the main deck, shall be measured and included in the gross tonnage, if they cannot be brought under the category of spaces mentioned below in Section D.

Additions for buildings on the upper deck in the form of hatches, which are in connection with the holds, are only made when the total tonnage of such spaces or buildings exceeds—

½ p.c.	of the rest of	the	ship's tonnage	in a ship of over 100 tons.	
1	,,	,,	,,	from 100 to 50	,,
1½	,,	,,	,,	,, 50 to 30	,,
2	,,	,,	,,	,, 30 to 10	,,
2½	,,	,,	,,	of and under 10	,,

In each case of this kind the addition is to be given according to the excess number of tons.

(*Note.*—The cubic contents of hatches is ascertained by multiplying their interior length, measured at half height and half the breadth; by their interior breadth, measured at half the height and half the length, and the product with the average of the greatest and least heights of the hatches, measured from the upper

part of the frame of the hatch, or from the upper surface of the hatch itself, if this does not lie on a level with the frame, to the upper surface of the deck. Other buildings are measured in the way described in Section V. of the instructions for the measuring of ships; upper decks, on the other hand, according to the mode of measurement detailed in Section II. of the method of measuring spaces in the middle deck.)

D.

Spaces which are not to be included in the gross tonnage:—

The following spaces on or over the upper deck are exempted from measurement, and so are not taken into consideration in the question of the gross tonnage of a ship, namely:—

1. Spaces which are open on one or more sides, and which cannot be closed in so as to be employed for the carriage of any other goods than what can be taken on an ordinary open deck.

2. Detached descending hatches (cabin hatches), as well as skylights for cabins, or spaces, including crew, or machinery, which can neither be used for packing away provisions or goods, or can serve a fixed lodging for passengers or crew.

3. Machine spaces on the open deck, or in buildings which are not included in the gross tonnage, but are used for the passage of light and air, or as a protection for the engine-room.

4. Erections which are temporarily, and on short voyages put up to protect deck passengers, who otherwise would be exposed to the sea or the weather.

5. Passenger saloons (sleeping cabins not included) on the upper deck of coasting and river steamers, fitted up and exclusively intended for a shelter to passengers.

For necessary explanation, however, the number of tons of such a saloon should be separately entered on the certificate or statement of measurement with the express mention that it is not included in the gross tonnage. If any such saloon is built partly above and partly under the upper deck, only the part which is above the level of the deck can be exempted from the measurement or gross tonnage.

6. Spaces under the so-called over or protection decks (that is, decks which in steamers connect the upper surfaces of the variously divided poops, cabins, forecastles, etc., on the main deck with the sides of the ship), but only so far as they are constructed, and so lightly built that they are only useful as a protection against the sea and weather for passengers, crew, and cattle, during their stay on deck, and consequently cannot be employed to carry any other goods than such as can be carried on an ordinary open deck, so that the said over deck in reality only forms an additional security for life and property at sea.

a. For ships in coast, passenger, or cattle service, the requisites for exemption from measurement may be considered as met, when in the spaces referred to is found to be built :—

α. A sufficient number of scuppers or ports for the escape of any water which may enter the space, since it may be taken for granted that such a hold or space cannot in consequence be considered suitable except for the carrying oversea of an ordinary deck cargo, but when such openings can be stopped up permanently, there shall also exist either :—

β. Openings in the sides of the space, as passages for cattle, if such passages can be closed with doors, shutters, or any other similar contrivance, or :—

γ. Openings in the protection deck itself, as passages for cattle, even if such passages can be closed or covered with gratings, loose planks, shutters, or any other similar contrivance.

δ. As far as no houses are found erected above or on the protection deck, for passengers or crew, and as far as this deck is not given such fixed side rough-tree rails, that deck cargo can be carried on such deck. No account is taken of light erections exclusively used for the navigation of the ship, such as steering and look-out houses, chart-house, etc.

b. In cases when the above requisites are met the space under the protection deck is to be treated as an ordinary open space, and it is, in consequence, not taken into consideration in ascertaining the gross tonnage of the ship; on the other hand, the separately divided and fixed spaces built under the protection deck are to be measured and reckoned as ordinary buildings on the open deck.

c. Exceptions under points 4, 5, and 6 can only be recognised after the owner, agent, or the captain has given in a representation to the general director of rates and taxes, and this has been conceded. On the representation, in which there ought to be given as complete a description as possible of the space referred to, the proper measuring official will have to report through the head office for the measuring of ships.

E.

The following spaces are admitted to deduction from the gross tonnage:—

a. Spaces for the lodging of the crew.

1. Separately divided spaces, as well above as under the upper deck, fitted up as lodging for, as well as exclusively used by, the crew, or the officers, or engineers of the ship (in the last are included also the ship's doctor, but *not* the captain, the steward, or persons belonging to the service of the passengers), but only in so far as the spaces referred to meet with the following requirements:—

α. The space is properly constructed, sufficiently lighted, ventilated in the right way, and thoroughly protected against the sea and weather, as well as against leakage from the cargo, or from water standing in the ship.

β. That it has a cubic contents of not less than 66 cubic feet for each man, and a surface, measured on the deck or the floor of such a space, of at least 11·3 square feet for each man; but for ships of under 100 tons gross, only 5 square feet, if the space is situate under the deck.

γ. That it is kept free from all sorts of goods and stores not being the personal property of the crew.

δ. That it is marked with the number of men who can or shall have lodging in it.

b. Spaces for the use of the crew.

2. A mess-room, as far as such a room is exclusively used for the officers and engineers of the ship. The deduction for such a space not to exceed four tons. No deduction can be made for officers' mess-rooms in passenger ships if such ships are not provided with a separate mess-room for the use of passengers.

3. A mess-room, as far as such a room is exclusively used for the petty officers of the ship. The deduction for such a space may not exceed two and a-half tons.

4. A bath-room, as far as such a room is exclusively used for the officers and engineers of the ship. The deduction for such a space may not exceed two tons. No deduction can be made for the bath-room in passenger ships if such ships are not provided with a separate bath-room for passengers.

5. Cook-houses (galleys), whether such a space be constructed on or under the upper deck, if it be not of greater extent than is necessary for the cook in his business of providing food for the crew.

6. Spaces set apart for water-closets for the crew, whether such spaces are constructed on or under the upper deck, but only if they are of reasonable size and number.

c. Spaces for navigating and working the ship. Separately divided spaces constructed on or over the upper deck, which are intended for, and exclusively used in, navigating and working the ship, namely :—

7. Instrument cabin for keeping charts, instruments, etc. In case that such a space is used at the same time by the captain as a cabin, the deduction which is allowed for the space which is taken up by the chart, etc., must not exceed three tons.

8. Wheel or steerage-house to protect the man at the wheel.

9. Look-out house.

10. Signal locker.

11. Spaces occupied by the machinery for steam capstan, apparatus for drawing up the anchor, apparatus for distillation, etc., but only so far as they are no greater than is necessary for the purposes mentioned.

D.

Maximum deduction for spaces for persons and machinery. To avoid mistakes, until fresh directions are issued, the spaces for which deduction is admitted under *a*, *b*, and *c*, will be distinguished in accordance with the gross tonnage of the ship in the following way :—

Gross Tonnage.	The deduction for personal spaces named under *a* and *b* must not exceed	The deduction for navigating spaces named under *c* must not exceed
For ships of over 1,000 tons ...	The total deduction must not exceed 5 per cent. of the gross tonnage.	
From 1,000 to 500	6 per cent. of gross tonnage ... ... The total deduction must not exceed 50 tons.	1 p.c. of gross tonnage.
„ 500 „ 300	7 p. c. of gross tonnage, and not over 30	5 tons.
„ 300 „ 200	8 do. do. do. 21	4 „
„ 200 „ 100	9 do. do. do. 16	3 „
„ 100 „ 50	10 do. do. do. 9	2 „
„ 50 „ 30	11 do. do. do. 5	2 „
„ 30 „ 10	14 do. do. do. 3·3	1 „
Under 10 ...	18 do. do. do. 1·4	

C.

With regard to the measuring and reckoning of the above-named spaces, see partly the circular of ship's measurement No. 3, of October 29th, 1868, which, excepting in the case of the above-mentioned alterations and limitations, remains entirely unaltered.

Section 2.

Rules regarding the deduction for propelling power in steamers.

A.

The rules given in Section IV. of the instructions for measuring ships, of September 7th, 1867, for reckoning the deduction for the spaces which are occupied by or necessary for the motive power, are hereby annulled, and in their stead the following rules will come into force for every new measuring or re-measuring from the 1st October, 1878.

After the number of tons in the spaces occupied by machinery, boilers, etc., have been ascertained in conformity with the rules given in Section IV. of the instructions, the deduction is reckoned for the motive power in the following way :—

1. For screw steamers, by adding 75 per cent. to the above-named number of tons (*i.e.*, 1¾ times the number of tons measured).

2. For paddle steamers, by adding 50 per cent. to the above-named number of tons (*i.e.*, 1½ times the number of tons measured).

But the deduction must, in no instance, exceed 50 per cent. of the gross tonnage.

Note.—By spaces occupied by or necessary for the propelling power shall be understood the spaces which are occupied by the machinery and boilers themselves, and also the spaces which are inseparable from the necessary working of the machinery; in screw steamers, further, the spaces which are taken up by the shaft trunk; and, finally, the separately framed-in spaces on middle decks, in the upper deck, or in buildings which have been included in the gross tonnage, which are occupied by the screw, or which serve to give light and air, or passage, to the actual machine-room.

The method of reckoning described above, which is clause *b*, section 23, of the British Merchant Shipping Act, 1854, and generally called the Danube Rule, is in uniformity with that recommended by the International Ships Measuring Commission in Constantinople in 1873, and is accepted by Holland and Spain, as well as by the European Danube Commission and the Suez Canal Company.

B.

To ascertain the deduction for partial re-measuring with respect to the machinery spaces of Danish steamers which trade to the States, which do not use the above-named method, but, on the other hand, the so-called "German Rule," namely Germany, Norway, Italy, as well as Austria-Hungary, the deduction for the motive power must be fixed according to the rules given for the German Empire in Secs. 16 and 17 of the "Schiffsvermessungs Ordnung von 5re Juli, 1872," namely thus:—

The entire space taken up by or required for the machinery boilers, the shaft trunk, as well also as the permanent coal bunker, is measured in the following manner:—

1. A mean length of the spaces occupied by the machinery and boilers (and in this is included the length of the fixed permanent coal bunker in connexion with the engine-room) is measured.

Next, three transverse areas are taken in the usual way, one at the foremost bulkhead, one at the after bulkhead, and one other at the middle of the length of engine-room.

To the sum of the two end areas add four times the middle area, upon which multiply the total sum by one-third part of the distance between the areas. The product gives the cubic contents

of the whole space. If there occur in ships provided with more than one deck separately divided spaces,—on middle decks, in the upper deck, or in buildings, which have been included in the gross tonnage (engine hatches on a wholly or partly open deck are not taken into consideration), which are occupied by the funnel, or which serve to provide light and air or passage to the actual engine-room, or to the coal bunkers, the cubic contents of such spaces is found by multiplying their mean length, breadth, and depth with one another. The cubic content of these spaces is added to the cubic contents of the actual engine-room, as also the cubic contents of the shaft trunk.

3. With the exception of steamers, which are exclusively used for towing, the deduction must in no case exceed 50 per cent. of the gross tonnage.

4. As permanent coal bunkers are so considered only such spaces as are exclusively intended and used for storing up coal for the engine, and which for that purpose stand in direct connection with the engine-room, so that any coal bunkers which are *not* absolutely permanent, but only divided off from the cargo-hold by moveable shutters, or the passage to which is formed in some other way than by the usual scuttles for coal in the deck or by sliding-doors or other openings in the engine-room, *cannot* be included in the deduction for propelling power.

5. As an explanation of the result of measuring according to the method here described, there will be appended to the statement of measurement in the Certificate of Nationality and Registration of Danish steamers the following form:—

	Tons.	Cubic Metres.
Gross Tonnage		
1. Deduction for spaces for use or lodging of crew (up to 5 per cent. of gross tonnage)		
2. Deduction for navigating spaces, &c.		
3. Deduction for engine, boiler, and shaft trunk, as well as for the permanent coal bunkers		
Net tonnage according to "Schiffsvermessungs Ordnung," 5th July, 1872.		

C.

Besides the two methods of measuring above described under A and B, there is used still a third method, namely, the "English Rule," according to the Merchant Shipping Act, 1854, Art. XXIII., a and b, by Great Britain and her Colonies, Sweden, and, as a rule, by France, which also, until the coming into force of the present circular, has been used in this country.

Although the method of measuring is identical with that of the Danube Rule, the reckoning of the deduction is made in the following way. If the measured number of tons in reference to gross tonnage forms :—

a. For Screw-Steamers.

1. Over 18 p. c., or under 20	32 p. c. of the gross tonnage is deducted.
2. 18 p. c., or under, or 20 p. c. or over	The measured number of tons + 75 p. c., is deducted. (In such cases the reckoning is, in consequence, identical with the Danube Rule.)

b. For Paddle-Steamers.

1. Over 20 p. c., or under 30	37 p. c. of gross tonnage is deducted.
2. 20 p. c., or under, or 30 p. c. or over	The measured number of tons + 50 p.c. is deducted. (In such cases the reckoning is, in consequence, identical with the Danube Rule.

Thus, the main differences between British and Danish tonnage is due to an extension of the British Rules used in Denmark to the measurement and inclusion in the gross tonnage of cook-houses, distilling apparatus, water-closets, wheel-houses, steam steering or capstan gear, look-out-house and signal lockers, which spaces are subsequently included within certain limits in the deductions, and the cancelling the percentage system of allowance for engine-room in section 23 (*a*) of the Merchant Shipping Act, 1854, retaining as their rule of allowance for engine-room the rules prescribed by clause *b* of said section of the British Act, which rule is now known as the Danube rule of allowance for engine-room.

Deck cargoes are not measured in Denmark.

RIVER PIRATES SIXTY YEARS AGO.

IN the year 1797, a magistrate acting for the city and liberties of Westminster and the Tower of London, published a book concerning the Police of the Metropolis, "containing a detail of the various crimes and misdemeanours by which public and private property and security are at present injured and endangered;" and one of the most interesting chapters in it relates to plunder as then carried on in the River Thames. The author states that at the time he was writing, which was sixty-two years ago, the thefts upon the river and quays of the Thames amounted in value to £500,000. By how much it falls below that sum at the present time it is not possible to say. Those who are cognizant of the plunder that even now goes on are very few, and we doubt whether there is any record at the present time that would enable us to draw anything like a trustworthy comparison. Our present object is, however, not to give a narrative of the ingenious methods by which valuable articles are abstracted from ships, wharves, and lighters in 1879, but to present to our readers the aspect of affairs as we find it recorded at the time the book we are referring to was written. Our author says: "The prevailing practice of discharging and delivering the cargoes of ships by a class of *aquatic* labourers known by the name of *Lumpers* and *Scuffle hunters*, is one principal cause of the evil so severely felt, but is not the only cause." "These aquatic labourers are for the most part in connection with the journeymen coopers and watermen, who are also supposed to share the plunder. They generally go on shore three times a day, and being in a body together, it is difficult and sometimes not very safe for a Trinity or police officer to attempt to search or even to secure them. By the contrivance of a thin sack suspended by strings from the shoulders and placed under the waistcoat a surprising quantity of sugar is carried away, exhibiting to the superficial observer only the natural protuberance of the belly." Besides the depredations which these river plunderers make upon the property of their employers, they practise another device by connecting themselves with men and

boys known by the name of *mud larks*, who prowl about and watch under the discharging ships when the tide will permit, and to whom they throw small parcels of sugar, coffee, and other articles of plunder, which are conveyed to the reserves by these *mud larks*, who generally have a share of the booty. Besides these associates in villainy, scullers and others in boats are in like manner constantly hovering about and under the discharging ships upon pretence of carrying passengers and baggage, into which handkerchiefs of sugar and coffee, bladders of rum, kegs of tamarinds, and even bags of cotton, sacks of wheat or flour, and in short every portable article that can be safely plundered are passed through the scuttles and port holes of the ships, and immediately concealed by the pretended watermen. Besides the different classes of delinquents which have been named there are gangs of more audacious offenders known as river pirates who ply upon the Thames during the night in boats provided for the purpose, and forcibly plunder whatever they can obtain from lighters, or from the quarters or decks of ships. The author then gives instances in which these river pirates actually stole one of the anchors and a complete new cable by which the ships were moored; he goes on to say that, "and as all other classes of labourers who work on the river are more or less associates in the same species of criminality they connive at the delinquency of each other, and hence it is that with so many opportunities, and with such a perfect system (by means of receiving shops) for the purpose of concealing fraud, so very few are detected, many of the lightermen (so says our author) are also supposed to be deeply concerned in this complicated system of pillage and plunder, and they too have their tricks and devices for the purpose of robbing shippers and importers of their property;" and he goes on to explain the method of stealing oil by placing the casks bung downwards in the barge, and gives as instance a quantity that filled 14 casks thus "leaked" into the barge, "and would have been appropriated to the use of the lighterman, who after attempting to rob the owner of so valuable a property complained very bitterly of his (the owner) ill usage in taking it from him." "The lumpers, however, have the largest share of the plunder on the river. Their system has been long matured,

and they are prepared at all points with iron crows and hand vices to draw nails without noise, and apparel made with a view to this object; for besides the bag already described, they are generally furnished with two pairs of trowsers, and with frocks made in a particular manner, with large pockets, for the purpose of concealing and conveying plunder. It has been asserted that it is no uncommon practice to obtain from gangs of lumpers a premium merely for the liberty of being permitted to labour gratuitously in the discharge of vessels having particular cargoes on board. Wages become no object at all wherever there is a prolific harvest for plunder. The watermen who assist these lumpers are also large sharers in the plunder they assist in removing. An apprentice, in this line, has been mentioned to the author as keeping both a mistress and a riding horse from the profits of his delinquency." "There exists at present (that is, sixty years ago) a club of working lumpers, where above sixty of these plunderers meet regularly and subscribe a certain sum for establishing a general fund, out of which the penalty of 40s., adjudged by the Bum Boat Act to be paid by every person convicted of conveying goods pilfered from vessels, is regularly discharged. Some of the members of this club, although apparently common labourers, are said to have their houses furnished in a very superior style, and to be possessed of property in the funds."

The author's remedy for most of the evils he complained of, was the formation of docks, for at the time he wrote, ships had to discharge their cargoes in the pool, and it all had to be conveyed away in lighters. But even in his time there were persons who prowled about on shore near the river for purposes of plunder, and of these the author writes: "These (who are distinguished by the nick name of *Scuffle hunters*) prowl about the wharfs, quays, and warehouses, under pretence of asking employment as labourers and porters, but their chief object is to pillage and plunder what comes in their way." The writer, from whom we have been quoting, wrote only of London, but there is every reason to suppose that other ports suffered as much in their own way as did London. Indeed, in another part of his book, our author is at pains to show that *employés* in the dock yards of his day, and the extra officers

of Customs, or *glut men*, as he calls them, often relied more upon pickings in the shape of plunder and hush money, than on their regular pay. Owing to improved police arrangements, and the construction of proper dock accommodation, but owing more, perhaps, to the abolition of high Customs' duties and the spread of education, this state of things as recorded sixty years ago is impossible now; but even at the present moment London stands at the head of ports where plundering of cargo, such as it is, does go on, and it is, as it was sixty years ago, carried on by the labouring classes who are engaged in discharging or removing cargo, or who profess to desire to be so engaged, and the police staff now as then is unequal to grapple with the evil. There are still men who are provided with beautiful little saws for the purpose of cutting nails and screws without removing the heads; and splendid little instruments for neatly opening and closing packages without leaving suspicious marks; and it is not possible to estimate the amount of plundering perpetrated when, having got behind a sort of barricade of goods in a hold or elsewhere, they dexterously ply beautiful tools on packages afterwards passed up through the hatchways or to the shore without a sign that they have been tampered with. Sugar and the like are not worth stealing in driblets, now-a-days; but silk and valuable things that will pack into small compass, and can be easily concealed and removed, afford a lucrative source of "perquisite" to the dock labouring and dock and ship loafing fraternity. Bulky packages of goods and merchandise do occasionally disappear, both from railway and other vans and from ships and lighters, but the business of "lifting" such things is not as it used to be, a monopoly in the hands of the fraternity of mudlarks, lumpers, scuffle hunters, and river pirates.

In concluding these remarks, we wish to be very careful in stating emphatically that we in no way associate the lightermen and watermen with the classes just spoken of. The working watermen and lightermen of the River Thames of the present day, and their apprentices and assistants, are a very superior set of men and have nothing in common with the objectionable persons our old author alludes to. In fact they are a different race altogether, with

higher aims; and we have heard that some of the best among them are desirous that reforms should be introduced into their ancient Guild, so that they may more readily and effectively than they can now, purge their body of any member who may be found hereafter "not up to the mark," or who may wish to force his services on an employer without first having undergone an impartial examination by an independent examining board which shall establish beyond question his competency, sobriety, honesty, and general fitness. The watermen and lightermen of London possess a monopoly, and this being so it is only natural that those members of the fraternity who have the good characteristics of Tom Tug (and they are many) are desirous in the interests of fair play that only men who are above suspicion shall be members of so privileged and honourable a corps or brotherhood as is theirs. This natural yearning for improvement and fairness is very praiseworthy, and we wish them every success towards its fulfilment. We should not have referred to the watermen and lightermen of the present day in the same article with their predecessors of sixty years ago had it not been that by the holding of a mass meeting and by the reports in the public press they thrust themselves into prominence at the moment we were writing.

ON CERTAIN SHORT METHODS IN NAVIGATION.

By A. C. Johnson, R.N.

THE accompanying little table has been devised with the view of abbreviating and simplifying certain important and useful problems in navigation. While affording results sufficiently accurate for all practical purposes *at sea*, it will be found to reduce the labour of computation to a minimum, which is at all times a matter of importance to the navigator, and especially in bad weather, when the motion of the ship frequently occasions a condition of things unfavourable to the successful carrying out of lengthy calculations of the nature of those involved in the methods generally employed. It will be seen that the actual computation consists of two short portions pre-

cisely identical in form, and at the same time independent of each other, so that the first may be worked as soon as the observation is taken; and as few logarithms are required, and as there is but very little addition or subtraction of arcs, the computation may be completed very expeditiously, and with less liability to error than in the more lengthy methods.

TABLE of Corrections for Abbreviating Double Altitudes, the Reduction to the Meridian, &c.

Dec.	A	Dec.	A	Half Int. or Hour Angle.	B	Half Int. or Hour Angle.	B
° ′	−	° ′	−	min.	+	min.	+
	sec.		sec.		′		′
3 0	·1	15 40	2·3	8	·1	62	2·1
4 0	·2	16 0	2·4	10	·1	64	2·3
5 0	·2	16 20	2·5	12	·1	65	2·4
6 0	·3	16 40	2·6	14	·1	66	2·4
6 30	·4	17 0	2·7	16	·1	67	2·5
7 0	·5	17 20	2·8	18	·2	68	2·6
7 30	·6	17 40	2·9	20	·2	69	2·6
8 0	·6	18 0	3·0	22	·3	70	2·7
8 30	·7	18 20	3·1	24	·3	71	2·8
9 0	·7	18 40	3·1	26	·4	72	2·9
9 30	·8	19 0	3·3	28	·4	73	2·9
10 0	·9	19 20	3·4	30	·5	74	3·0
10 30	1·0	19 40	3·6	32	·6	75	3·1
11 0	1·1	20 0	3·7	34	·6	76	3·2
11 30	1·2	20 20	3·8	36	·7	77	3·3
12 0	1·3	20 40	3·9	38	·8	78	3·4
12 20	1·4	21 0	4·0	40	·9	79	3·5
12 40	1·5	21 15	4·1	42	1·0	80	3·6
13 0	1·6	21 30	4·2	44	1·1	81	3·7
13 20	1·6	21 45	4·3	46	1·2	82	3·8
13 40	1·7	22 0	4·4	48	1·3	83	3·9
14 0	1·8	22 15	4·5	50	1·4	84	4·0
14 20	1·9	22 30	4·6	52	1·5	85	4·1
14 40	2·0	22 45	4·7	54	1·6	86	4·2
15 0	2·1	23 0	4·8	56	1·8	87	4·3
15 20	2·2	23 15	4·9	58	1·9	88	4·4
15 40	2·3	23 30	5·0	60	2·0	89	4·5

Multiply A by the Time, and B by the Declination.

On the Use of the Table.

Enter the table with the declination and hour-angle, and take out A and B. Multiply A by the minutes in the hour-angle, and B by the declination, marking the former correction −, the latter +.

Example.

Given H.A. 30m. 10s., Dec. 10° N.: to find arc (a) and arc (1).

	H.A.		A		Dec.		B
	m.	s.	s.				
	30	10	·9		10°	0′ N.	·5′
		− 27	30			+ 5	10
(a)	29	43	27·0	(1)	10	5	5·0

Here, Dec. 10 gives ·9 sec. for A; and H.A. 30 min. gives ·5 for B. Multiplying ·9 by 30, and ·5 by 10, the corrections are − 27 sec. and + 5′.

To find the Latitude and Longitude by two Altitudes of the Sun.

Both observations are supposed to be taken within an hour and a half of noon, and at a sufficient interval to ensure, if possible, a difference of not less than 1½ or 2 points in the bearings. The longitude by dead reckoning should not be more than 40 or 45 miles in error, and it is to be used in finding the hour-angle at each observation. This hour-angle and the declination are to be corrected by the elements taken from the Table. The remaining portion of the work is best explained by the following examples:—

Example.

In lat., by account, 45° N., long. 10° 0′ W., the following observations were taken; to find the ship's position:—

	H.A. h.	m.	s.	Alts.	Bearings.	Runs.
(1)	1	18	1	51°	S. 33° E.	0
(2)	0	41	9	54°	S. 17° W.	

H.A. h. m. s.	Dec.	H.A. m. s.	Dec.
1 18 1	10° 0′	41 9	10° 0′ N.
Corr. − 1 10 (Tab.)	+ 34 (Tab.)	− 37 (Tab.)	+ 9 (Tab.)
(a) 1 16 51	(1) 10 34	(a) 40 32	(1) 10 9

Sec. (a)	·02489		Sec. (a)	·00683	
Sin alt.	9·89050		Sin alt.	9·90796	
Cos. (2)	9·91539	(2) 34 37	Cos. (2)	9·91479	(2) 34 44
		Lat. (1) 45 11 N.			Lat. (2) 44 53 N.

On the meridian of 10° W. on the chart, are marked latitudes (1) and (2). The position lines, at each observation, being drawn through these points, intersect in lat. 44° 59′ N., long. 10° 26′ W., which is the place of the ship.

Example II.

In lat., by account, 50° N., long. 10° 20′ W., the following observations were taken : to find the ship's position :—

	H.A. h. m. s.	Alts.	Bearings.	Run.
(1)	1 13 13	47°	S. 29° E.	S.S.E. 3 miles.
(2)	0 40 26	49°	S. 17° E.	

	H.A h. m. s.	Dec.		H.A. m. s.	Dec.
	1 13 13	10° 0′ N.		40 26	10° 0′N.
Corr.	— 1 6	+ 29		− 36	+ 9
(a)	1 12 7	(1) 10 29	(a)	39 50	(1) 10 9

Sec. (a)	·02186		Sec. (a)	·00659	
Sin. alt.	9·86413		Sin. alt.	9·87778	
Cos. (2)	9·88599	(2) 39 43½	Cos. (2)	9·88437	(2) 39 59
		Lat. 50 12½ N.			Lat. (2) 50 8N.

Lat.	50 12½ N.	Long.	10 20 W.
Run S.S.E. 3′	3 S.	Run	2 E.
Lat. (1)	50 9½ N.	Long.	10 18 W.

Turning to the chart, we draw the meridian of 10° 18′ W., and on it mark latitudes (1) and (2). The position lines drawn through these points intersect in lat. 50° 6′ N., long. 10° 23′ W., which is the place of the ship.

Example III.

In latitude, by account, 52° N., long. 20° 26′ W., the following observations were taken to find the ship's position :—

H.A. h. m. s.	Alt.	Bearing.	Run.	Noon Lat. by Obs.
1 3 24	48°	S. 24° E.	N.E. 10′	52° N. (2)

	H.A. h. m. s.	Dec.
	1 3 24	12° 0′N.
	− 1 22	+ 26
(a)	1 2 2	(1) 12 26
Sec. (a)	·01611	
Sin. alt.	9·87107	
Cos. (2)	9·88718	(2) 39 32

Lat. (1)	51 58 N.	Long.	20° 26′ W.
Run	7 N.		12 E.
Lat. (1)	52 5 N.	Long.	20° 14′ W.

On the meridian of 20° 14′ W. are marked latitudes (1) and (2). The position lines drawn through these points intersect in long. 20° 32′ W. Hence, the ship's position is lat. 52° 0′ N., long. 20° 32′ W.

NOTES.

1. *To find the Hour-Angle.*—To the G.M.T., by chronometer, apply the equation of time, with its sign from p. 1 (*Nautical Almanac*) : the result is G.A.T. To the latter apply the longitude in time, adding in East longitude, subtracting in West : the result is the hour-angle.

N.B.—If the hour-angle is less than 24 h., subtract it from 24 h. ; if greater, subtract 24 h. from it.

2.—Whether to take the sun or difference of arcs (1) and (2) is easily seen by reference to the latitude by account; with which the latitude by observation must be made to agree. Or thus : When latitude and declination are of the same name, take the sum of (1) and (2); when of different names take their difference. Also, if the ship is between the sun and the equator, take their difference.

3.—If latitude (2) confirms latitude (1) no further work is necessary, and the position of the ship is satisfactorily determined.

4.—The first observation may be worked as soon as taken, and the second part of the work follows the same order as the first.

5.—The latitude alone may be found by a single observation, if taken within 30 or 40 minutes of noon.

6.—When an altitude near the meridian and the meridian altitude can be taken with any degree of accuracy, the ship's position may be found as in Example III.

7.—The bearings at each observation are to be taken from an azimuth Table. The position lines are at right angles to these bearings.

8.—The longitude by D.R. is only required roughly. The longitude corrected for *run* must be used in finding the second hour-angle.

(*To be continued.*)

[In going over the above simple and ingenious methods we find that the results obtainable can only be regarded as approximate, and that in rare instances will they be found strictly accurate. We have, however, much pleasure in publishing them on the authority of so good a navigator as Mr. Johnson, leaving it to the seaman to test their accuracy.—Ed. *N. M.*]

GENERAL AVERAGE.

YORK AND ANTWERP RULES.

A review of the progress made since the date of the Antwerp Conference of the Association for the Reform and Codification of the Law of Nations in September, 1877, *in obtaining the adoption of the York and Antwerp Rules.*

By Sir Travers Twiss, Q.C., D.C.L., &c., Chairman, and H. D. Jencken, Barrister-at-Law, Hon. Secretary, of the Committee on General Average.

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Example III.

In latitude, by account, 52° N., long. 20° 26′ W., the following observations were taken to find the ship's position:—

H.A. h. m. s.	Alt.	Bearing.	Run.	Noon Lat. by Obs.
1 3 24	48°	S. 24° E.	N.E. 10′	52° N. (2)

	H.A. h. m. s.	Dec.
	1 3 24	12° 0′N.
	− 1 22	+ 26
(a)	1 2 2	(1) 12 26
Sec. (a)	·01611	
Sin. alt.	9·87107	
Cos. (2)	9·88718	(2) 39 32

Lat. (1)	51 58 N.	Long.	20° 26′ W.
Run	7 N.		12 E.
Lat. (1)	52 5 N.	Long.	20° 14′ W.

On the meridian of 20° 14′ W. are marked latitudes (1) and (2). The position lines drawn through these points intersect in long. 20° 32′ W. Hence, the ship's position is lat. 52° 0′ N., long. 20° 32′ W.

NOTES.

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cordingly the leading men of that society convened a public meeting on the 30th May, at the Cannon Street Hotel, London, to take in consideration the best means to be adopted to secure the assent of the steamship and sailing-vessel owners of the United Kingdom, to the York and Antwerp Rules. The meeting thus held was largely attended by shipowners, underwriters, average staters, and others interested in this question; a resolution was adopted, appointing a central committee, styled "The English Central Committee," thus distinguishing it from those appointed on the Continent of Europe, and in the United States of America. The committee thus appointed was instructed to obtain a declaration from the shipowners of the United Kingdom to insert in all Bills of Lading and Charter-parties issued by them, the following clause:—"General Average, if any, payable as per York and Antwerp Rules;" it being further agreed that this assent should become operative from and after the 1st January, 1879. Of this Committee Mr. John Glover was appointed Chairman, and Mr. R. Lowndes, Hon. Secretary.

In conjunction with the International Law Association, this Committee at once set to work to obtain assents, Mr. Richard Lowndes undertaking the arduous task of gaining over the shipowners of the United Kingdom, whilst Mr. H. D. Jencken accepted the duty of obtaining the assents of the shipowners and others of foreign countries. The result of their labours is now published, and may be summarised as follows:—

In Great Britain and Ireland, to the 31st December last, the signatures of 788 owners of steamships and sailing vessels have been appended to the following declaration, viz.:—

"We, the undersigned, owners of steam or sailing ships, being of opinion that it is desirable there should be uniform Rules of General Average for this and other countries, and taking note of the resolutions unanimously passed at the Conference held in London on the 30th May last, hereby announce that on and after the 1st January of 1879, it is our intention (whilst reserving liberty of action in exceptional cases) to insert in our bills of lading and charter-parties the following clause:—'General Average, if any, payable according to York and Antwerp Rules.'"

The names thus appended represent a registered tonnage equal to about 43 per cent. of the entire tonnage of the Mercantile Marine of the United Kingdom. But, inasmuch as the subscribers of this Memorandum are principally owners of large-classed vessels, such as the steamers of the Cunard Line, the White Star Line, the National Steamship Line, or Mr. Henry Green's ships, the proportion of foreign-going vessels is much larger, and may be taken at not far off 75 per cent. of the British shipping engaged in our foreign trade. This is a most significant fact, for upon the owner of a foreign-going vessel fall the losses and delays occasioned by the absurd multiplicity of rules regulating General Average losses which now prevail, as varied as the climates to which our trade extends.

Simultaneously with the movement on the part of our great shipowning firms and companies, the Marine Insurance Companies and the Board of Underwriters of Liverpool have agreed to accept risks, subject to the York and Antwerp Rules, in case of General Average losses. Rapid as this combination is, those who are best informed confidently believe that before the spring of the year is reached, upwards of three millions of British registered tonnage will be represented on the "assent" list; and it is understood that encouraged by the example of those who have already joined powerful firms, the Assurance Clubs of the United Kingdom will follow their lead and incorporate these rules into their regulations. Thus far the results of the labours of the English Central Committee may be said to have been a complete success.

On the Continent of Europe, in the United States of America, and in the British Colonies, great progress has likewise been made. The Norwegian shipowners have with singular unanimity accepted these rules, supported by the leading insurance companies of that country.* The example of the thrifty Norwegian will have an

* The tonnage of the Mercantile Marine of Norway, according to Veritas, is:—

	Steamers.	Sailing Ships.
	38,679 Reg. Tons.	1,374,824 Reg. Tons.
Of Sweden	54,975 „	413,719 „
Of Germany	172,932 „	914,674 „

unmistakeable influence on all the other northern races, who regard Norway as the school of underwriting.

The lists from Sweden and Denmark have as yet not been received, but no doubt is entertained that the same unanimity will prevail in those countries. In Germany, where this movement took its origin, at the Bremen Conference of the above-named association, held in October, 1876, the keenest interest is now being taken in all the northern sea ports. In Bremen, the Underwriters' Bourse has adopted the rules. The North German Lloyd's has agreed to accept them, so also the transatlantic steamship companies of Hamburg; supported by the Chambers of Commerce of these two cities. The Imperial Government of that country has in consequence appointed a commissioner to report on the York and Antwerp Rules, with a view to future action by the Legislature, and this commission is to meet at the end of February.

In the Netherlands the Honorary Secretary of General Average Committee for Holland, Dr. Rahnsen, has sent information that they, the Dutch shipowners and underwriters, are prepared to follow the lead of England. The Italians are, it is understood, quite prepared to move in this matter. In France only has a reluctance to move been expressed, unless the British Government should take the matter in hand. The 741st Article of the Code de Commerce being regarded by the French as a bar to any change, though those who have raised this objection admit that a special contract would, as a matter of course, supersede the law.

On crossing the Atlantic, we find that in the United States of America the greatest unanimity prevails. The Boards of Underwriters of New York, Boston, Philadelphia, St. Francisco, have all voted the adoption of the York and Antwerp Rules, supported by the great Marine Insurance Companies of those cities.

"UNITED STATES OF AMERICA.—The undersigned Marine Insurance Companies and Underwriters hereby announce, that on and after January 1, 1879, General Averages, adjusted in accordance with the York-Antwerp Rules, will be recognised in the settlement of claims under their policies of insurance, when the intention so to adjust the average is expressed in the bills of lading or charter-party, at or before the commencement of the voyage."

Signatures are appended on behalf of the following Insurance Com-

panies:—*New York:* The Atlantic Mutual, Commercial, New York, Sun, Pacific, Orient, Mercantile, Great Western, and Phœnix Marine, Insurance Companies. *Boston:* The Washington, Boylston, India, Mercantile Marine. China Mutual, New England, Shoe and Leather, Boston Marine, American Manufacturers, and Neptune Marine Insurance Companies. and a number of private Underwriters. *Philadelphia:* The Board of Underwriters of Philadelphia. *San Francisco:* The California, Union, Firemen's Fund, Commercial, British and Foreign, Standard, St. Paul, New Orleans, Union, Paris Underwriting Association, New Zealand, State Investment, Swiss Marine, Transatlantic of Berlin, North-Western, and National Marine Insurance Companies and Agencies, also several private Underwriters; besides a number of others from Bath, Rockland, and Bucksport, Maine, Newburyport Mass., and Galveston.

At the same time, a large number of the leading ship and steamship owning firms of those cities have supported their underwriters by subscribing the above-quoted declaration of assent.

From British America information has been received, that the adoption of these rules is being seriously entertained, and lists of subscribers to the memorandum of declaration have already been received from nearly all the ports from our British-American possessions. The replies from Bombay, Calcutta, and other Eastern ports are favorable, and so soon as complete lists reach these cities from England, the Chambers of Commerce and Shipowning Associations are, it is understood, prepared to take action. In our other Colonies and settlements, committees have been formed, especially in Melbourne, Adelaide, etc., to support this movement.

The summary thus far rendered sketches out in barest outline what has been accomplished during the last four or five months. The enormous area covered has, it can be readily understood, rendered rapid progress impossible; the mere time occupied in asking for information takes up months; and before business men commit themselves to any measure affecting their interests, they take time to consider the matter. It is, however, confidently believed, that before the close of this year an all but universal adoption of these rules will have been secured in our colonies.

The lesson taught by this great movement is most instructive. The commercial community has learnt that by mere *consent*, by private agreement among themselves, a law may be created, and that

difficulties may be overcome by joint action on the part of merchants, shipowners, and bankers in any matters affecting their interests. This lesson has been further instructive in proving that International Law, which hitherto has been only a scientific mode of pointing out conflicting laws of different countries, may become, by the mere *consensus* of those concerned, a law international in its truest meaning, that is, an international convention, regulating the dealing of international commerce. The necessity of creating uniform rules, and upon them basing uniform International Laws, will gradually develope the growth of a uniform international practice amongst all classes; and once that the conviction of this necessity becomes universal, the day will not be far distant when common laws and a common practice will regulate the commerce of the civilised world.

AN ILLUMINATED BUOY.

FROM time to time many projects have been suggested for illuminating the numerous buoys placed to mark shoals and channels around our coasts, but we imagine none have yet been found to combine the elements of certainty, efficiency, and practicability.

A promising plan, however, has lately been brought forward. Pintsch's Patent Lighting Company, who make gas in an economical manner from various kinds of fatty refuse, and by an ingenious mechanical contrivance compress it into very small spaces, have recently submitted to the Trinity House a model buoy of their construction, containing an internal chamber charged with their compressed gas. Connected with this chamber is a small vertical pipe, communicating with a burner enclosed in a small and strongly made lantern at the apex of the buoy, and about eight feet above the line of the buoy's flotation. On lighting the gas it burns, both by day and night, and the lamp is so constructed that neither wind nor rain, nor waves dashing over it, can affect the regular maintenance of the light. The gas is admitted

to the pipe supplying the burner by an automatic arrangement, the working of which depends chiefly upon the pressure of the surrounding atmosphere. The model buoy submitted to the Trinity House was placed in an exposed position near the Mouse Light-vessel, at the entrance of the Thames, where it remained for four weeks, burning day and night without intermission, and without any other supply of gas than that provided at the beginning of the trial. It appears to be only a question of size in regard to the gasholder, whether the light shall keep going for one, two, three, four, five, six, or even twelve months, with only one filling.

Our readers will not fail to see how valuable such a buoy would be for night navigation. The making out of buoys at night is one of the most trying duties of masters, officers, and seamen, and lighted buoys would materially diminish the anxiety and uncertainty attending the performance of such duties. We are informed that some larger buoys are now being constructed by the Trinity House, capable of holding gas for six months' consumption, and in the interests of navigation, we trust that after further trials it may not be long before the authorities find themselves justified in recommending that these buoys be generally made use of.

We hope to be able to keep our readers informed of the progress of the experiment.

DUBLIN BALLAST—" ANGLO-SAXON " INQUIRY.

THE last Wreck Abstract published by the Board of Trade furnishes some instructive figures relating to the losses of vessels in ballast. It appears that 200 British vessels in ballast, not including fishing vessels, were reported during one year as having been totally lost from causes other than collision, and 697 vessels in ballast as having met with casualties resulting in damage more or less serious. Of the 200 vessels in ballast which were totally lost 13 were missing, 26 foundered, and 7 were lost from causes not enumerated. Strandings accounted for the remainder of the total

losses (154), but it must be remembered that vessels in ballast are often light, and therefore not so much under control on a lee-shore as they should be; and it must also be remembered that vessels are sometimes ballasted with mud or wet sand, which is very liable to get mixed with any water shipped from above or taken in below, and thus to choke the pumps and render the vessel utterly unmanageable with awkward results to the crew. As might be expected the loss of life arising from casualties to vessels in ballast was very serious. Two hundred and thirty-two persons were lost by the casualties referred to above, of whom 92 were lost in the 13 missing vessels, 25 by foundering, 94 by stranding, and 21 by various losses; 18 persons were lost from vessels in ballast which met with collision, thus raising the total of lives lost to 250. In our recent notice of the wreck abstract we did not unnecessarily direct the attention of underwriters, as chiefly interested, to the dangers of bad ballast, but the recent formal inquiry into the circumstances attending the abandonment of the barque, *Anglo Saxon*, bound from Dublin to Quebec in ballast, makes the question appear to be deserving of the attention of the Imperial Legislature.

The Court had no hesitation in condemning the ballast which was put on board the *Anglo Saxon*, and which upon all the evidence was said to be a very fine sand and for the most part wet, the bank from which it was taken being covered by the water every tide. It appeared by the Dublin Port and Docks Act, 1869 (32 and 33, Cap. 100) Section 40, and following Sections, that the master of a ship requiring ballast was very much in the hands of the Harbour Board. They are empowered by the Act, Section 41, to furnish "such description of ballast as they from time to time think fit by agreement with the master or owner of every vessel." By Sections 47 and 48, penalties are imposed for taking on board other ballast than that furnished *unless notified to the Harbour Master*. It might be contended that under this exception the master had some option as to the nature of the ballast. He stated that he had objected to the ballast to the broker for the vessel, and had been informed that he must take what the Board gave him, and accordingly the ballast which the Court thought was

very objectionable was put on board. It was trimmed in the usual manner by an experienced ballast trimmer, and said on all hands to have been properly trimmed. The Court thought it right to "call the attention of the Board of Trade to the provisions of the Act before referred to, as they were certainly of opinion that the ballast was not such as should have been put on board this vessel, and that it mainly contributed to her loss, while, to say the least, the provisions of the Act place the master or owner of a ship requiring ballast at Dublin in considerable difficulty and doubt as to his rights and liabilities under such circumstances."

Judging by the opinion of the Court in this case we fear that Home Rule in the matter of ballast is not a success in the port of Dublin, and that the sooner the present system of ballasting vessels in that port is revised, the better it will be for owners, underwriters, and above all, for the sailors who have to risk their lives in the vessels. Fortunately the crew were saved in this instance, and were able to fix the blame upon the proper parties, or probably the loss of the vessel would have been attributed by some persons, to causes very wide of the ballast forced upon her by the regulations of the Dublin Port and Docks Board. Pending the alteration in the law which this report shows to be absolutely necessary, perhaps something might be done by the Board of Trade Surveyors by way of stopping any vessel attempting to leave the port of Dublin with such improper ballast on board, but in the meantime, vessels sailing from that port in ballast will continue to be undesirable risks for underwriters and sailors.

TRACKS ACROSS THE ATLANTIC.

[The following correspondence has been forwarded to us, and the importance of the subject justifies our re-publishing it *in extenso*. We shall be glad to learn the views of masters and others acquainted with the navigation of the North Atlantic and its necessities.—Ed. *N. M.*]

"White Star Line, Liverpool, 11th December, 1878.

"To the Right Hon. the President of the Board of Trade, London.

"My Lord,—Having been much impressed by the earnest desire which your Lordship has ever shown to promote the best interests of the Mercantile Marine of this country, we have thought that we might venture to call attention to the mode in which the navigation of the North Atlantic is at present conducted.

"It is estimated that, taking the English and Irish Channels as points of departure, no less a number than 2,500 steam vessels of full power proceed thence to the United States of America and return in like manner during every year.

"At the present time these vessels, with the exception of a limited number which follow a fixed track, are navigated indiscriminately according to the discretion of their respective commanders.

"This system, or rather absence of system, has long been considered by experienced and competent authorities to be fraught with very great danger, and it has been strongly urged that if all these vessels confined themselves to one special track for the outward, and to another for the homeward voyage, the chances of collision would be most materially lessened, to the manifest advantage of all concerned.

"This subject has been very ably and exhaustively treated by Lieutenant Maury, of the United States Navy, to whose standard work thereon, so well known to all nautical men, we would more especially refer; and he maintains, with great force, that if a certain 'belt' or 'zone' were adopted by steamships generally, in which they would exclusively navigate, not only would collision, as between them, be rendered all but impossible, but likewise

sailing vessels would avoid, to a great extent, this fixed track, and thereby diminish still further the danger of collision; to which may be added, that disabled vessels, or those requiring assistance, would, under such a system, be more readily fallen in with.

"This very important subject is one which has already engaged the attention of the Board of Trade, for your lordship will find that so far back as December, 1873, a copy of Memorial from the Bordeaux Chamber of Commerce, addressed to the French Minister of Marine, and warmly advocating the adoption of such a plan as we have described, was forwarded by the Assistant-Secretary, Mr. Thomas Gray, to the North-Atlantic Steam Conference at Liverpool.

"We have ourselves also, at different periods, urged this subject upon the consideration of the same body, and notably upon the 1st January, 1876, when our Mr. Ismay addressed the annexed letter, marked A, to the secretary: so far, however, we regret to say that no common action has been agreed upon, and the existing dangers, so apparent to all, remain in full force.

"This subject we may mention has likewise been fully considered by Mr. E. M. Archibald, H.M. Consul at New York, who being no doubt impressed with the dangers of the present mode of navigation, made some very appropriate recommendations in his general report for 1876, published in the *Times*, and we thought it desirable on that occasion to address H.M. Consul at New York the annexed letter marked B, in order that he might be aware that others were also alive to the dangers which he described, and sought by all means in their power to avoid them.

"We submit to your lordship very earnestly, that as matters at present stand, and with the very large and increasing steam traffic across the North Atlantic there is a great danger to human life, and that valuable property also, is exposed to unnecessary risk; and although we are aware that the Board of Trade cannot issue sailing regulations for waters which are beyond their jurisdiction, we would yet urge that much good would accrue, if your lordship would instruct the responsible officers of your Board to consider the whole question in the light of the various facts as known and published, and we feel sure that if a minute were issued, containing

a recommendation based upon their deliberations, it would command respectful attention, and would tend to bring about that uniformity of action, which, in the absence of recommendation from some undoubted authority, has hitherto failed to take effect.

"Your lordship will readily see that we feel very strongly the grave responsibility which rests on those who direct the movements of Atlantic steamships, and it is this which impels us to advocate, however imperfectly, the system of fixed outward and homeward routes, and we deem the present time, when so much disaster has occurred both to river and ocean steamers, a very fitting one in which to solicit your lordship's aid and assistance in mitigating an acknowledged danger and peril by means, which, while simple, would, we believe, prove effectual.

"We have, &c.,

"(Signed) Ismay, Imrie, & Co."

"White Star Line, Liverpool, 1st January, 1876.

"Gray Hill, Esq.,

"Secretary, North-Atlantic S. T. Conference.

"LANE ROUTES.

"Dear Sir,—Referring to the failure to agree upon an international rule obliging all steamers passing between Europe and North America to follow fixed Lane Routes (which, personally, I much regretted at the time), and having since given a good deal of consideration to the matter during four transatlantic passages made within the past eighteen months, I have determined, so far as practicable, with this Company's steamers, to follow Maury's Steam Lanes, and would suggest that a conference be called, to consist of a nautical and lay representative from such of the European Lines as may respond to an invitation to be issued by the North-Atlantic Steam Traffic Conference, and that a Committee thereof make a joint report, to be unanimously adopted; the responsibility of non-agreement to rest with those who do not accept the Committee's recommendation.

"The lanes, if generally adopted, would, I think, materially lessen the risks of collision and of ice.

"Pending the discussion of this subject on the part of the conference, the commanders of the White Star steamers are instructed to follow the routes named.

"I am, etc.,

"(Signed) THOS. H. ISMAY."

"White Star Line, Liverpool, 10th June, 1876.

"E. M. Archibald, Esq., H.B.M. Consul, New York.

"Sir,—We have noticed in *The Times* and other newspapers an abstract of your Report this year, wherein reference is made to the question of lane routes across the North Atlantic, and the importance of all the steamship lines agreeing upon the paths to be adopted.

"We may mention that (although doubtless you are already aware of the fact) this company's steamers have for some time followed certain well-defined tracks, varying according to the season of the year, as recommended by Lieut. Maury, U.S.N., and confirmed by the experience of the oldest navigators crossing the Atlantic.

"More than this, at the turn of the year our senior addressed a letter to the Secretary of the North Atlantic Steam Traffic Conference (copy herewith) urging upon the members the necessity of fully considering the matter, with the view of definitely fixing upon certain routes to be followed by all the Conference members' vessels; but, we regret to add, the subject could not be unanimously dealt with.

"We think it right that you should be made aware of the fact that this Company is alive to the importance of this question, and that we are perfectly ready at any time to alter the tracks at present followed by this Company's steamers in favour of others which might be unanimously fixed upon.

"We should be glad if you could suggest any course whereby this end might be obtained, as we would gladly co-operate with you, in order to settle upon a satisfactory basis a matter which affects the safety of the numerous steamships and sailing vessels trading in the North Atlantic.

"We are, &c.,

"(Signed) ISMAY, IMRIE & Co."

HELM SIGNALS.

(*Communicated.*)

IN the December number of the *Nautical Magazine* was published a letter from "Another Steamboat Master," following up correspondence in the November number on the subject of helm signals; that is, of signals which are intended to denote to outside observers the actual position or movements of the helm, or else to denote *intention* as to these movements. The subject is one which has attracted more and more notice as years have gone on, and, since the *Princess Alice* collision, has received a distinct impulse. There appear to have been some twenty plans of this kind submitted to the Thames Navigation Committee, and the recent proposed changes in the regulations for preventing collisions, have admitted the principle for steamers, so far as sound signals are concerned. Under these circumstances a careful examination of the whole question, a statement of the principles involved, and of the methods available for putting into practice such principles as may be expected to really conduce to the safety of sea traffic, are deserving of the attentive consideration of mariners.

And, first of all, it must be observed that there are two broad considerations dividing the subject into two divergent channels which have really little in common, although no clear distinction is usually made between them. There are in fact two separate classes of signals, proposed, and possible; but unless we are going to adopt both—which is exceedingly unlikely—it is necessary, before taking any steps whatever, to ascertain which of them we really want. There are, first, signals expressive of an *intention* to use port or starboard helm, to pass to the left or right of an approaching ship, which were christened "Warning Signals" some ten years ago. Such signals are not automatic; they express the *intention* of the person in command of the ship, and *warn* an approaching ship of such intention. They cannot be used except at the will of the person in command, and need not represent a helm movement at all. Take, for instance, the case of a ship at

night—say a steamer—seeing on her port bow the green light of another steamer. Under the existing law the first steamer is bound to keep her course; but if the other has no look-out,* or a bad look-out, keeping the course may be exceedingly dangerous. If the green light simply approaches without any change of bearing, the conditions are alarming,† even though the original distance be considerable. Now, if warning signals were established, they would in this case be something with a double purpose; they would be meant to attract notice in the first place, and to express intention in the second. The proper signal would be one which should say to the ship owning the green light: "Wake up: I am in the right to leave you on my left-hand side‡ by keeping my course, so do not run across my bows." Such a signal would in other words express an intention *not* to starboard,‡ and by consequence might cover an intention to port, if porting were lawful under the circumstances. Take, again, the converse case of the steamer showing a green light and seeing a red one. Such a ship

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* [If a steamer "has no look-out, or a bad look-out," which latter we presume is equivalent really to no look-out, we do not understand how or why she should be expected to see a "helm light." A steamer without a look-out, or with a look-out so bad that she fails to discern a permanent red or green side-light, would fail to see a temporary red or green helm indicator light. To cure the evil that one ship does not know that there is no look-out on another ship, the logical and only remedy would be for that other ship to hoist a signal which should mean "I have no look-out." We point this out to show at once the absurdity of supposing that a temporary light will wake up a ship with no look-out. A sound signal may do it but not a light signal. If steamers do not keep a look-out, they disobey one of the most ordinary precautions of seamen, and no signal can meet such a case. Not only is this so, but if signals were provided on a supposition that they could make up for bad look-out, they would expressly provide for and dangerously encourage that fatal neglect.—Ed. *N.M.*]

† [And we would add "it is time for the ship which is required by law to keep her course, to slow her engines, as she is also required to do by law."—Ed. *N.M.*]

‡ [This would be a wrong signal. The signal should only be "I am keeping my course, as required by law."—Ed. *N.M.*]

might be in fear of the vessel with the red light not keeping her course, and under such a condition of alarm, her proper signal would say, "I see you; do not starboard, for I am about to leave you on my left hand." This signal again would express an intention not to starboard, but it might or might not express an intention to use port-helm. On the other hand the steamer showing the green light might hold the opinion that there was room enough for her to pass ahead of the ship showing the red light, and if this were the case, the danger might be from the red light porting after the green light had really cleared him. Then green light's proper signal would be, "I see you, and am going to leave you on my right hand; do not make my movement more dangerous by the use of port-helm, but let me cross your bows in safety." This signal again would cover the use of starboard helm, though no helm of any kind was used. Again, the ship showing the red light might consider that there was room for the ship showing the green light to pass a-head of her, and that the only danger was lest she should port her helm. In this case the signal would be, "I see you; pass on, and do not port, for I am about to leave you on my right hand."*

Now all these apparently various signals are seen to be reducible to two, which might be expressed nearly in the words suggested by the Board of Trade Committee, namely, "I am directing my course to starboard;" and, "I am directing my course to port." It will be seen that it does not make it a necessity that a ship,

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* [It seems to us much simpler to leave things alone, and not complicate matters by requiring shipowners to provide pyrotechnic or other lights. Commercial depression is bad enough now, and to saddle all ships, large and small, with additional lights, pyrotechnic or otherwise, would be to cause a cruel outlay, as well as useless if not dangerous arrangement. If a good look-out is kept; if the ship which is required to keep her course keeps it; and if the other keeps out of the way, as required by law, the difficulty would be met. Collisions happen, first, because the ship that is required by law to keep her course does not keep it; and, secondly, because the ship that has to get out of the way (often through defective look-out) fails to take proper steps until too late. Extra lights will never touch those evils.—Ed. *N.M.*]

showing either of these signals, should actually put her helm over either way. The real point established is that if she says, "I am directing my course to starboard," it is quite certain that she will not put her helm a-starboard; and if she says, "I am directing my course to port," it is quite certain that she will not use port helm. All this is clear if we reflect that a steamer showing a red light may allow another showing a green light to cross her bow from port to starboard by a simple reduction of speed, as may also the ship showing a green light allow the other to cross her bow from starboard to port, also by a simple reduction of speed. These considerations apply to the question which has been so usefully debated before Lord Sandon's Committee; the question about small sailing vessels and their rights as against steamers and other large vessels in the river. A steamer of great size going down the river with a fair wind, observes a barge close-hauled on the port tack stretching across from her starboard bow. The steamer is helpless by reason of her size,* and fearing a collision, she signals to the barge, "I am directing my course to port."† This is a signal to the barge to go about and not to try to cross the steamer's bows, because to do otherwise, would in the event of the steamer's really directing her course to port, be unseamanlike and dangerous, but the steamer does not necessarily put her helm a-starboard because there is no room for her to go to port to any extent, and because she achieves her purpose in making the barge tack. So we see that whatever be the language with which each of these two warning signals is put, as though the maker of the signals uttered the words, their meaning to the receiver of the signal cannot be mistaken. One signal means, "do not attempt to cross my

* [The steamer cannot leave the deep-water channel, and the barge does not need deep water. We would refer our contributor to the introduction to Mr. Gray's last book on the Rule of the Road. All this is very good for river navigation, as is there shown; but for the open sea anything of the sort would be mischievous.—Ed. *N.M.*]

† [The steamer ought not to make the signal recommended by our contributor. Her signal ought simply to be "your barge must get out of *my* way, I cannot get out of your way."—Ed. *N.M.*]

bow from port to starboard." The other means, "do not attempt to cross my bow from starboard to port."*

So much, therefore, for the purely "warning signals," expressive of *intention.*† We now come to "helm signals," which express not an intention, but a fact which is either accomplished, or in course of being accomplished. Such signals must in all cases be automatic, and attached to the helm, and to be perfect, they must express a great deal more than any plans we have yet heard of succeed in doing. The simple fact conveyed by an automatic signal from one ship to another approaching her, that the first ship has her helm a-starboard, or a-port, is nothing. Very few ships carry their helms amidships, and the character and amount of helm necessary to keep a ship on her course vary continually with the speed, and the state of the wind and sea. For a ship to show starboard helm when her helm is really "steady," though not amidships, may become a fatal piece of information to an approaching neighbour. So to show port helm equally, whether there be a spoke of it, or all that can be given, is an equally misleading signal. Again, if the helm has been hard a-starboard, and shows starboard helm by signal, notwithstanding that the order "hard a-port" has been given, and the helm is being righted as fast as possible preparatory to the porting, we are worse off than if we had no signal whatever. On the other hand, the automatic signals will do little for us if they did not show the *rapidity* with which the helm was being moved, as well as its character and amount. A helm moved with violent speed, means almost certainly that it will be put hard over, and will considerably influence the ship before it can be reversed; whereas a helm moved slowly and deliberately is a helm most likely altered by the helmsman merely to correct a yaw, and which is, therefore, very likely to be reversed.‡

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* [We do not so read them. We simply read them as the rules say they are to be read, "*I* am directing *my* course," &c.—Ed. *N.M.*]

† [It seems to us that our contributor properly contradicts himself here. They are, as he now says, "expressive of intention on the part of the ship making them."—Ed. *N.M.*]

‡ [We quite agree in this with our contributor. The evidence given before the Thames Traffic Committee is as conclusive to us as to him. We expressed opinions against lights as helm-signals some years ago.—Ed. *N.M.*]

On the whole, therefore, we get, as necessary for our warning signals proper, only the conditions that they shall be two perfectly distinct signs, either visible or audible. For the automatic helm signals we require that they shall show us (1) the character of the helm used; (2) the amount of it; (3) its motion, whether fast or slow; and (4) whether the amount of helm shown is necessary to keep the ship on a straight course, or is causing her to turn. There is, therefore, very considerable difficulty attending the employment of helm signals at all, and very much greater difficulty than attends the employment of warning signals.

But there is also a most important difference between the helm signal and the warning signal, which must not be passed over. The approaching ship observing a helm signal has no guarantee whatever that such signal has any connection with her approach. The signal has been made to her irrespective of the will of the person in command, and it may be reversed at any moment. Such a consideration is less important for ships in very close quarters, and especially when going in the same direction; as, for instance, between two ships going up the Thames nearly side by side. In this special case the automatic helm signal, if not useful, is at least not dangerous, and might possibly save a rub of side to side, which otherwise would occur. But those who invent and advocate the helm signals have cases entirely different in their minds. They mentally refer to the "nearly end-on" cases almost exclusively; and their view is that A, nearly end on to B, gets a helm signal from her, she can obey that signal with identical helm on her own part, and so pass clear on either side, according to the helm used. This idea demands the closest thinking out, and brings us face to face with a grave consideration, which affects the warning signal equally with the helm signal.

The automatic helm signal must, from its nature, be free in its use. It will denote illegal helm impartially with that which is legal. The warning signal can be restricted to legal movements. Ought it to be so restricted? and if so restricted, should an illegal signal be obeyed, whether it be a warning, or a helm, signal?

The Committee of 1877 decided that the proposed sound warning signal should only be used to denote "any course

authorized or required by the regulations." And, as a consequence, it would seem doubtful, at least, whether a ship receiving a warning signal, denoting a movement which was *not* "authorised or required by the regulations," would be doing right in obeying it. If it were so, then an illegal signal ought, as a rule, to be neglected when the signal was a warning signal, and it would follow that an illegal automatic helm signal should be equally neglected. But, then, would not such neglect place a ship in a more dangerous condition than if no signals whatever had been used? The answer does not seem to be alike for both classes of signals. The warning signal has expressed an intention, and whether legal or illegal, it is most probable that that intention will be carried out. Hence, though if an illegal warning signal has been received, the recipient is in any case in a critical position, we might advise him to obey it, with some confidence that we were doing the best for his safety. But the illegal helm signal has not expressed any intention; it merely shows that the helm has been put the wrong way, and it is exceedingly probable always that the mistake will be corrected. Hence we are placed in a great dilemma. If there were no law, no helm movement would be illegal, and every helm signal might be responded to without so much fear, but there being always a preference in helm movements, there is a doubt about responding to a wrong one, lest a right one should thereupon supervene.

But as to the rule framed by the Committee of 1877, there is something to be said on the other side. In the earlier paragraphs illustrating the use of the warning signals, we took two ships fairly distant from one another, and without doubt bound by the existing "Rule of the Road." Under such conditions there would be some difficulty in allowing a free use of the warning signals, because this would put it into the power of either ship to abrogate the rule of the road at her discretion. But when ships draw into very close proximity, the rule of the road disappears between them, and then "a departure from the rules" is allowed if it is necessary to avoid immediate danger. It would seem that where a departure from the rules is permitted, a signal indicating such departure might also be permitted; and if this is so, it might be

fairly argued that the Committee should have added the proviso to this clause, freeing the use of the proposed sound signals when the danger was immediate. Just in the same way also with helm signals, we may say that we should be safe in responding to the helm-signal of any ship when we were very close to her, whether we thought the helm movement denoted were right or wrong; and for the very simple reason that we might suffer damage if we declined to respond, while, on the other hand, the danger might pass away before our opponent had time to correct his mistake, even if he discovered it. The difficulty, however, consists in the fact that there is, and can be, no exact line of demarcation between a set of conditions when the rule of the road must be obeyed, and a set of conditions when it is abrogated. "Immediate danger" cannot be defined. With very long ships, at very high speed, it extends to hundreds of yards in space, and minutes in time. With very small ships, at very low speed, "immediate danger" is not represented by more than a few yards of space and a few seconds of time. If, therefore, we free the warning signals for conditions under the "immediate danger" clause we should find it very difficult to draw the line at all, and might produce very nearly the same effect as if we freed them altogether.

But something hinges on the nature of the warning signal employed. The American Navy adopted, some years ago, warning signals devised in England—green and red pyrotechnic lights. These signals were intended for the open sea,* and from their nature could only be usefully employed when the approaching ship was at a considerable distance, and therefore clearly under the law. Hence, in England, it was proposed that they should only be used to warn ships of strictly legal movements, thus forestalling the views of the 1877 Committee. The American Navy seemed to have missed the point of the invention, for they freed the use of the signals and so far abrogated the law. With the proposed sound warning signals the case appears to be just

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* [These were the pyrotechnic signals of Captain Colomb, R.N. The United States seem to have given them up very readily.—Ed. *N.M.*]

the reverse. It is impossible to use them with effect at any considerable distance, and at the short distances to which they are available there would always seem to be the doubt as to whether the rule of the road is binding. Possibly the same reasoning which led the English Government to object to freeing the visible warning signals, as was done in the American Navy, would, if pursued to its consequences, lead to suggesting that the audible signals now proposed should be free.

In general terms we might say that the proper function of the visible warning signal, whose range is considerable, should be the avoidance of undue proximity between ships; while that of the audible warning signal, whose range is small, should be the avoidance of collision after proximity has been reached either by accident or necessity.

The function of the helm signal would naturally be always confined to the latter effort.

It seems hardly necessary to suggest a visible warning signal in the day-time, but if such a thing were ever thought to be useful, an ordinary flag signal from the International Code would seem to supply all that could be desired. If there were found to be objections to colour of the pyrotechnic sort for night work, the varied flashes of a white light offer not only an unbounded field, but the opportunity of bringing the visible and sound signals into harmony. If a single blast of a steam whistle meant "I am directing my course to starboard," and a double blast "I am directing my course to port," a single flash of white light might mean the one, and a double flash the other. But in the case of such visible signals, they would require repetition, and hence a series of signal flashes would represent the single sound blast, and a series of double flashes would stand for the double blast. Practically the pyrotechnic colour and the flash of white light are the only means by which warning signals can be conveyed to any distance with a distinctness beyond that of the ordinary side-light; and either method has this advantage, it has been very thoroughly tried through a long course of years at sea.

Sound does not yet appear to have been suggested as an automatic helm signal, but visible objects in the day-time and lights at

night have been suggested in all directions. Speaking first of what is in actual use, and has been so for years, we may mention the automatic helm signals employed in our war fleets. When a fleet is assembled for the purpose of exercise in manœuvring, each ship is fitted with an endless line, which passes round the barrel of the steering-wheel, and through a block twenty or thirty feet above it. When the helm is amidships, a green ball is attached to one part of the line, midway above the wheel; and at a similar point in the other part, a red burgee is fixed. The double difference of colour and shape makes these objects the more easily distinguished, the one from the other. When the helm is put to starboard, the green ball ascends, and the red burgee descends. When the helm is put a-port, a reverse action takes place, the green ball descends, and the red burgee ascends. The rapidity of the movement, of course, corresponds to the rapidity with which the helm is moved, and the distance apart of the two objects denotes the amount of helm—starboard if green is uppermost, and port if red is uppermost. This arrangement clearly fulfils all the conditions of a true helm signal but one, and that one is not so important in fleets. Ships carrying starboard or port helm will always show it, though it has no effect in turning the ship; but as the peculiarities of the ships in a fleet are known to each other, the exhibition of a permanent port or starboard helm conveys no erroneous information.

This system is, no doubt, very different from any proposed for general adoption. In the first place it is not used at night, and in the next it is not visible a-head or nearly a-head. It is essentially a system for ships in company whose heads are generally in the same direction.

When we come to the examination of helm signals proposed for general adoption, we must observe that, as a rule, the projectors do not appear to have fully mastered the problem.* Very few attempt to fulfil all the requirements which have been necessary in a true helm signal, and most of them do not attempt to satisfy more than one of them. Nay, some of them only propose to

* [We quite agree with our Contributor.—ED. *N.M.*]

do with additional lights and much additional complication, that which is already done by the fixed side-lights. If proceeding in any direction at night we see on our port bow a ship's red side light change to green it is quite certain that the ship is using starboard helm, and that she is using so much that the ship is obeying it. If, however, on the same bow we see a green light change to red, it is not certain that the ship is using port helm, though it is certain that either of our own motions, by the approaching ship's port helm, or by both combined, we have crossed her line of keel. If we see green change to red on our port bow it is certainly the result of port helm on the part of the other ship; but if, on the same bow, we see red change to green, we may have crossed the ship's line of keel without any helm movement on her part. In both these cases we get the most efficient helm signals, in the one case a dangerous, and in the other a safe helm movement is indicated, or if there has been no helm movement the safety has been reached by the motion of our own ship, which so far as her future acts are concerned is the same as if the other ship had done it. We have got red to red, or green to green, which for the time is a signal of safety and of consequent inaction on our own part. But the danger signal, the change from red to green to port, or from green to red to starboard, is a helm signal, and nothing but a helm signal of danger on the part of the other ship, to be met by a proper act on our own part. Again, a change of colour from red to green, or from green to red, right a-head is now a most precise and complete helm signal, which no additional lights or fittings can improve unless they show the rapidity with which the helm is moved, and the extent of its motion. The simple exposure of a second green, or of a second red light will not in any such case give us more information than is already conveyed by the change in the colour of the side-lights, when that change is visible.*

But there is this to be said in favour of the helm signal proper;

* [We are very much obliged to our Contributor for the great pains he has been at in writing for our pages the above masterly discussion of the subject. Years ago we arrived at the conclusion that warning lights connected with or indicating helm movements would make "confusion worse confounded," and we trust that our

we are not always in a position to see the change of colour spoken of. A ship may have put her helm hard a-starboard while only exposing her red light to an approaching ship, and it may continue a-starboard for some time before the change of colour takes place. It is fairly argued that the approaching ships should have more timely warning of the act than is now possible, and if attention is at all legitimately turned to the question, it may be directed to the supply of this desideratum, or to the disclosure of port helm when the green light only is in sight. It will be noted that it is of less importance to show starboard helm when the green light alone is exposed, or port helm when the red light alone is exposed, because the act proper to avoid a red light would usually be proper whether the ship showing it was under steady helm, or under port helm, and so also with the red light. In daylight it is pretty certain that no such helm signals are called for. Simple observation of the opening or closing of the masts out of, or into line affords very complete evidence of the helm in use.

But when we attempt to provide for these requirements at night, we are met by the very serious consideration of the extra lights and extra gear which most of the plans involve. No doubt we

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Contributor's able paper will bring others over to our view. It is, we think, conclusive against helm-light signals, while it contains nothing against the legitimate use of sound signals. If a warning light is wanted at all, it is wanted not on board steamers, but on board sailing ships, and should never be used or mistaken for an indication of helm movement. It might be a very good thing if a ship, close-hauled on the starboard tack, could make the fact known by flashing a light, or firing a maroon, so that another sailing vessel crossing might know she (the other one) is to keep out of the way; and, also, if a sailing ship, close-hauled on the port tack, could do the same to warn a sailing vessel, with the wind free, to keep out of the way. But these indications are only useful for the open sea, and are contingent on a good look-out. The rules and lights for different rivers will differ from each other, and none of them can be sea rules. For instance, one rule, that appears from the evidence given before Lord Sandon's Committee, is the rule for steamers rounding points, and this is wholly inapplicable at sea. Another is the overtaking rule. On all rivers having rules the overtaken ship has to keep out of the way, whereas at sea the overtaker has to keep out of the way. The crossing rule, good at sea, appears by the evidence (which confirms all we have said before) to be quite unsuitable for rivers.—Ed. *N.M.*]

should get a nearly perfect helm signal by using green and a red light on an endless line in connection with the steering wheel, so arranged that they should travel vertically up and down before the fore-mast, but when we think of the labour involved in trimming and keeping such lights in order, and of even the cost of the appliance, we are reasonably deterred from proceeding in this direction, unless we can be assured that the demand is imperative. Then we equally reasonably condemn any system of showing a second green light to starboard for starboard helm, and a second red light to port for port helm, for this arrangement does not meet the first requirement of a helm signal. A plan, which we have noted, for showing a red light at the mast-head for port helm, and a green light on each bow for starboard helm, seems to look simplicity and completeness. Another for a single light at the mast-head showing green for starboard helm, and red for port helm, is no doubt simpler, but it has all the disadvantages we have already adverted to. The simplest plan we have heard of was suggested, if we are not mistaken, by the present First Sea Lord of the Admiralty, and was intended either as a helm signal, or as a near-at-hand warning signal. The proposal was to fit an eclipse or shade to the existing side-lights, so as to "flash" them, and this eclipse might be connected with the wheel if desired. The proposal was that "flashing" the green light rapidly showed mean starboard helm, and "flashing" the red light showed mean port helm; or, if the flashing was done by hand, the *intention* to use starboard or port helm. But, as we have seen, this plan itself, though eminently simple, would not be complete. Generally, we want the green light to show port helm, or the intention to port; and the red light to show starboard helm, or the intention to starboard. The plan would retain its simplicity and gain in completeness if we followed the *rôle* of the sound signals, and made single flashes of either colour denote, "I am directing my course to starboard"; and double flashes of either colour to denote, "I am directing my course to port."

It is, however, certain that the whole question is full of doubt and difficulty, and that any hasty decision may produce evil effects. Much careful thought and considerable experiment are absolute necessities before any change could be ever permitted.

ON THE DOUBLE ALTITUDE PROBLEM.

In this Problem there are two positions of the ship, and it is necessary to reduce the first observation, made at A, to what it would be if made at the second position, B, at the same instant of absolute time. There are two methods of doing this:—

First Method.—With lat. of A, the sun's decl., and the true alt., find (by the Chron. Prob.) the hour-angle H, to which apply −diff. long. made good during the run between A and B: this will give H′ the hour-angle at B, corresponding to the same instant of absolute time at which the alt. was taken.

Second Method.—With lat. of B, the same sun's decl., and the alt. corrected by the Formula:—corr. of alt. = dist. run × cos. (true az. of sun − true course), calculate an hour-angle H′, which will be the same as before.

Many readers of the *Nautical Magazine* may wish to see this demonstrated mathematically, I therefore annex the Demonstration.*

Seamen know that the hour-angle of the ship for the same instant of absolute time varies with the change of meridian of the ship; it has therefore been a mystery to many seamen how an observation made at one place can be reduced to an equivalent observation at another place without using the difference of long. between the places.

The Demonstration above referred to, however, clearly proves that the diff. long. is properly attended to, although this is not *apparently* done in the Formula quoted in "Second Method."

I beg now to make a very important remark, viz., that almost all authors use indifferently true az. − true course and magn. az. − magn. course; these will certainly be equivalent if the ship's head be in the direction of the magnetic course at the time of taking the sun's bearing; but not otherwise. This, I believe, has been the fruitful source of bringing this Problem into disrepute among seamen. I shall reserve this point to another paper.

* DEMONSTRATION.

Let A and B be the two positions of the ship. At A I find the true alt. of sun to be a, the lat. by account is l, and the decl. of sun is d: from these (by the Chronometer Problem) I calculate the hour-angle H. And I desire to know what H′ the hour-angle at B will be at the same instant of absolute time as that at which the alt. was taken.

First Method gives H $-$ d (long.) $=$ H′.

Second Method directs to calculate H′ (by the Chronometer Problem) l + d (lat.) that is the lat. at B, the same decl. d, and the alt. a + (corr. for run =) D cos (Z − C): where D is the distance run, Z the true azimuth of sun at A, and C the true course from A to B.

I must, therefore, prove that H′, as found by these methods, is identically the same.

I must evidently apply two corrections to H, to find H′ as found by Second Method: viz., 1st, I must find the correction of H or d (H) for change of l = d (l); 2nd, d (H) for d (a); and add these together.

1st. By the well-known Differential Formula, d (H) = d (l) cot Z sec. l.

2nd. By another Differential Formula, $\mathrm{d}\ (\mathrm{H}) = -\dfrac{\mathrm{d}\ (a)}{\sin \mathrm{Z} \cos l}$.

But d (a) = D cos (Z − C) = D cos C cos Z + D sin C sin Z; and D cos C = d (l), D sin C = Departure.

Therefore d (a) = d (l) cos Z + dep. sin Z = sin Z cos l (d l cot Z sec l + dep. sec l). But dep. sec (l) = d (long.)

Therefore d (H) = − d (l) cot Z sec (l) − d (long.)

By adding the 1st and 2nd, we obtain d (H) or H′ − H = − d (long.), or H′ = H − d (long.): which is identical with the value of H′ found by 1st method.

Q. E. D.

Note.—In Raper's valuable Treatise on Navigation, in a note to No. 752, there is a curious instance of what Logicians call reasoning in a circle.

He uses the above-named Formula, for reducing the alt. at A

to what it would be at B at the same instant of absolute time: and it has been clearly proved that the diff. long. between A and B has thus been allowed for. But Raper attemps to prove this by general reasoning (not mathematical). It appears to me that his reasoning is equivalent to his having said, "I assume that the formula I have used does allow for the said diff. long., therefore I have no occasion to do so again." This is evidently not proof, but merely assertion.

J. GORDON.

Morden College, Blackheath.

CORRESPONDENCE.

GEOLOGIC STRATA AND ATMOSPHERIC CIRCULATION.

To the Editor of the "Nautical Magazine."

Dear Sir,—To such of your readers as take an interest in Geology, it must have seemed a rather bold statement to make that, during the early period of our globe's history, there existed in the earth a circulation analogous to that in the atmosphere; and yet the opinion was not advanced without some apparent foundation.

As far as I have noticed, and my observations have extended over a considerable district, *the line of strike of the rocks*, with few exceptions, *slopes down to the right of an observer looking down the line of steepest descent*. This would lead us to infer that, at that early date, the mountains had a rotatory movement in that direction, or with watch hands; and that the valleys and the mountains are simply cyclones and anticyclones in permanent forms.

Should this surmise prove correct, it will certainly be very curious if the seaman must become a geologist in order properly to understand the motions of the two elements,—sea and air,—with which he has chiefly to do, and it will afford a striking exemplification of the harmony which exists in Nature.

I write this in the hope that other observers may be induced to test whether this rule holds good generally, and it would be

exceedingly interesting if it should be found that south of the equator the rocks slope down to the left, and thus that the mountains there had had a rotatory movement against watch hands.

It would follow as a necessary consequence of this ancient rotation of the mountains that, in the northern hemisphere, the left bank of rivers should have a more precipitous character than the right, for on the right side of the valley the line of strike would be generally sloping in the same direction as the flowing stream, but on the left side in a contrary direction. This indicates a test of easy applicability everywhere; of course, in the southern hemisphere the right bank should be the more precipitous.

If M. Buys Ballot's law of the winds should in this way be found prevailing among the rocks, a proof would be furnished of so irresistible a nature as to enforce conviction.

Yours truly,

D. D.

January 11, 1879.

THE CASE OF THE "RICHMOND."

To the Editor of the "Nautical Magazine."

SIR,—An official inquiry was held some short time since at Swansea respecting the loss of the screw steamer *Richmond*, the result of which, as it regards the finding of the Court, has given rise to much discussion, and must be a sore puzzle to those who are unacquainted with the subtleties of law. The *Richmond*, on the 19th of November last, left Penarth Docks with a cargo of 1,233 tons of steam coal, bound to Malta. There were three hatchways on the upper deck—two before the bridge, and one aft—which it appeared were kept partially open for ventilation. All went well until the 22nd, when in crossing the Bay of Biscay, the weather became bad, and much water was shipped, and eventually it became necessary to batten down the hatches and cover them with tarpaulin. On the 24th, owing to an accumulation of gas, two explosions occurred, which so much damaged the ship that after making every effort to keep her afloat, but without success, the master and crew abandoned her, and shortly afterwards the *Richmond* was seen to go down.

It was proved at the investigation that the coal shipped in the *Richmond* was of a fiery nature, and evolved gas which, when mixed with atmospheric air, becomes explosive and terribly destructive. It was said that printed cautions as to the ventilation of coal ships had been posted up at the tips at Penarth, but that such caution had not been served upon the captain of the *Richmond*, nor had his attention been directed to it. Nevertheless, the captain was charged at the inquiry with having caused the loss of the vessel by his "wrongful act and default" in not seeing that the after-hold of his ship was properly ventilated, and the Court was invited to deal with his certificate. This jurisdiction was assumed by the Wreck Commissioner apparently without hesitation, and the certificate of the master of the *Richmond* was suspended for a period of six months, the Commissioner intimating that if it had been proved that a copy of the caution respecting ventilation had been served on the captain, a much more severe sentence would have been passed upon him. But further, the Commissioner appears to have founded his decision to deal with the master's certificate upon that provision of the 4th Section of the Merchant Shipping Act, 1876, which makes a master responsible for knowingly taking a ship to sea in an unseaworthy state. Looking to that section, I find that the master so offending is guilty of misdemeanour—this would be properly the subject of a prosecution in a criminal court, but I cannot understand how it could be dealt with by a Court of Inquiry, and still less, how the section can be cited as giving authority to deal with a master's certificate. Looking then to the Merchant Shipping Act, 1854, under which these Courts of Inquiry into wrecks and casualties have been instituted, I find sec. 242 provides that, "if upon any investigation conducted under the provisions contained in the Eighth Part of this Act, or upon any investigation made by a Naval Court, constituted as hereinafter mentioned, it is reported that the loss or abandonment of, or serious damage to, any ship has been caused by his wrongful act or default," *i.e.*, of the master or mate, his certificate may be dealt with by the Board of Trade, or as it is now settled by the Court investigating the case. But surely the "wrongful act or default" here mentioned is an act or default connected with the navigation of the ship, and was never

intended by the framers of the Act to apply to the stowage of the ship or the management of the cargo. Explosions of gas and the combustion of coal cargoes were not twenty-five years ago of frequent occurrence, and certainly were not then regarded as sources of unseaworthiness, for inattention to which a shipmaster should be held responsible. If my view of the law is correct, then neither under the Act of 1854, nor under any subsequent statute (that of 1876 inclusive) has a Court of Inquiry power to deal with a master's certificate in such a case as that of the loss of the *Richmond*. If I am in error in my interpretation of the law I shall be thankful to be set right by one of your numerous and competent readers; but if I am right, it is clear that the Court of Inquiry in this case of the *Richmond* has exceeded its powers. I, for one, attach much importance to the operations of these courts and to their decisions, and I am therefore anxious that these decisions should be at all times beyond question.

Yours faithfully,
A LOOK-OUT.

London, January 16, 1879.

SHIPS' LIGHTS AND HELM SIGNALS.

[We have received a great number of letters on the subject of ships' lights and signals for indicating the position of a vessel's helm or head, for which we beg to thank our correspondents. But in these communications many different plans are advocated, and if we published them all it is more than probable that we should receive a great number of criticisms and a great number of fresh suggestions, which the space at our command would not permit us to publish. We have therefore thought it desirable to forward the letters already received by us to the Secretary of the Thames Traffic Committee, the members of which are desirous of giving earnest consideration to any suggestions or opinions which may throw light upon the questions with which they are now engaged.—Ed. *N.M.*]

SHIPBUILDING, 1878.

Sailing Ships.

Ports.	No. of Ships 1878.	No. of Ships 1877.	Gross Tonnage 1878.	Gross Tonnage 1877.
Aberdeen	3	7	2,619	4,412
Banff	13	14	2,410	2,415
Barrow	7	6	1,346	2,124
Belfast	2	8	3,462	9,343
Bristol	1	3	16	614
Cowes	5	7	267	254
Dartmouth	47	59	3,336	4,494
Dundee	3	8	2,153	5,281
Faversham	27	26	1,155	1,194
Glasgow	40	52	46,190	54,439
Greenock	6	7	3,707	6,049
Grimsby	26	46	1,894	3,486
Hartlepool	1	2	1,543	2,740
Hull	32	43	2,458	3,301
Jersey	4	9	328	525
Liverpool	19	25	12,665	23,035
London	45	32	2,090	1,647
Lowestoft	9	17	288	541
Middlesbro'	—	4	—	3,089
Newcastle	4	1	182	83
Plymouth	18	13	917	848
Port Glasgow	7	8	6,781	10,674
Portsmouth	7	10	309	843
Rochester	15	21	656	966
Rye	22	21	1,198	1,129
Southampton	3	15	3,588	11,175
Stockton	1	3	1,499	3,146
Sunderland	22	32	18,440	32,152
Whitehaven	5	4	3,526	3,424
Workington	1	2	1,064	1,884
Yarmouth	36	42	1,689	1,817
Other Ports	165	177	18,011	19,137
Totals	596	724	145,787	212,661

SHIPBUILDING, 1878.

Steamships.

Ports.	No. of Ships 1878.	No. of Ships 1877.	Gross Tonnage 1878.	Gross Tonnage 1877.
Glasgow	111	85	99,846	64,439
Greenock	19	15	18,837	9,621
Port Glasgow	32	18	12,760	7,678
Sunderland	60	50	81,716	69,287
Newcastle	72	58	96,979	76,039
North Shields	24	10	16,388	2,045
South Shields	11	24	7,474	9,801
Liverpool	14	13	9,995	14,068
Dundee	9	12	8,937	6,941
Hartlepool	26	23	38,218	34,535
Aberdeen	8	4	5,396	3,085
London	17	12	1,567	840
Belfast	8	1	8,673	55
Stockton	16	6	23,773	9,051
Middlesbro'	12	22	13,725	23,875
Hull	7	3	10,800	5,874
Leith	7	2	1,345	216
Barrow	9	12	12,357	13,499
Whitby	7	5	10,573	7,071
Southampton	8	4	5,488	2,124
Whitehaven	1	—	1,273	—
Other Ports	32	25	5,395	3,142
Totals :—				
Steamships	505	404	491,515	363,286
Sailing Ships	596	724	145,787	216,261
Grand Total	1,101	1,128	637,302	579,547

From the above it will be seen that there is a good increase over 1877 in the number and tonnage of steamships built in 1878, but a decrease in the number of sailing vessels.

WEATHER FORECAST FOR FEBRUARY, 1879.

THE CURRENTS OR TENDENCY OF THE AIR OVER THE BRITISH ISLANDS FOR THE MONTH OF FEBRUARY, 1879.

Date.	Duration.	Force from		General Direction from	Duration.	Force from		General Direction from
Feb.		S.	E. or W.			N.	E. or W.	
1	0 h.m. to 11 h.m.	4	8	W.S.W.	11 h.m. to midnight	2	4	E.N.E.
2	0 m. „ 1 a.	2	9	W. by S.	1 a. „ „	1	4	E. by N.
3	1 a. „ 2 fol. m.	0	5	E.	0 m. „ 1 a.	0	11	W.
4	2 a. „ 2 „	1	4	E. by S.	2 m. to 2 a.	2	9	W. by N.
5	4 a. „ 1 „	2	4	E.S.E.	2 m. „ 4 a.	4	8	W. N.W.
6	5 a. „ 1 „	4	3	S.E.	1 m. „ 5 a.	8	6	N.W.
7	6 a. „ 1 „	5	3	S.S.E.	1 m. „ 6 a.	10	6	N.N.W.
8	7 a. „ 2 „	6	2	S.S.W.	1 m. „ 7 a.	12	4	„
9	8 a. „ 3 „	6	1	S. by W.	2 m. „ 8 a.	13	3	N. by W.
10	9 a. „ 4 „	6	1	„	3 m. „ 9 a.	13	3	„
11	10 a. „ 4 „	6	1	„	4 m. „ 10 a.	13	3	„
12	11 a. „ 6 „	6	2	„	4 m. „ 11 a.	12	4	N. by E.
13	... ...	...	...	...	6 m. „ midnight	9	6	N.N.E.
14	0 m. to 9 m.	3	4	W.S.W.	9 m. „ „	6	9	E.N.E.
15	0 m. „ 11 m.	1	5	W. by S.	11 m. „ „	3	11	E. by N.
16	Noon „ 3 next m.	0	14	E.	0 m. „ noon	0	7	W.
17	2 a. „ 2 „	4	11	E.S.E.	3 m. „ 2 a.	2	5	W.N.W.
18	3 a. „ 2 „	6	9	„	2 m. „ 3 a.	3	4	„
19	4 a. „ 1 „	8	8	S.E.	2 m. „ 4 a.	4	4	N.W.
20	6 a. „ midnight	10	7	S.S.E.	1 m. „ 6 a.	5	3	N.N.W.
21	6 a. „ 1 next m.	11	7	S.S.W.	0 m. „ 6 a.	5	3	„
22	7 a. „ 1 „	11	7	„	1 m. „ 7 a.	5	3	„
23	8 a. „ 2 „	11	7	„	1 m. „ 8 a.	5	3	„
24	8 a. „ 3 „	10	8	„	2 m. „ 8 a.	5	4	„
25	9 a. „ 6 „	10	8	„	3 m. „ 9 a.	5	4	N.N.E.
26	9 a. „ 6 „	8	9	S.W.	6 m. „ 9 a.	4	4	N.E.
27	10 a. „ 8 „	7	9	„	6 m. „ 10 a.	3	4	„
28	10 a. „ 11 „	5	11	W.S.W.	8 m. „ 10 a.	2	5	E.N.E.

NOTE.—Current due to the Sun at first S. Easterly; then conflicting Currents or Calms; and, towards end of month, S. Westerly.

REMARKS.

1. **The Table indicates**

Strong Westerly tendency from the 1st to the 5th inclusive.

„	Northerly	„	„	6th „	13th	„
„	Easterly	„	„	14th „	19th	„
„	Southerly	„	„	20th „	26th	„
„	Westerly	„	on the 27th and 28th.			

2. An examination of past weather would lead us to expect that

From the 3rd to the 11th would be the stormiest period.

„ 12th „ 20th anticyclonic (fine)

„ 21st „ 28th changeable.

Temperature probably low, as the Northerly and Easterly currents are of the longest duration.

3. The Westerly and Easterly currents doubtless overlap each other to some extent, and if equally balanced will produce these calms, with their attendants, fogs and mist; but if unequally, storms. The change from the Westerly to the Easterly currents, stated in the Forecast as occurring about the 11th or 12th, will probably take place earlier in the North than in the South, while on the other hand the change from the Easterly to the Westerly, occurring about the 20th or 21st, will take place earlier in the South.

4. Whilst the Moon is going South, or from the 3rd to the 15th, the normal changes of wind are: East, backing to North and West, calm, changing at once to East, backing to North, and so on. Fine weather during this period, with winds Westerly in the North, drawing round through North to Easterly, in the South. Again, whilst the Moon is coming North, or from the 16th February to the 2nd of March, the normal changes are: West, backing to South and East, calm; changing at once to West backing to South, and so on. Fine weather during this period, with winds Easterly in the South, drawing through South to Westerly in the North.

D. D.

Watch and Watch.—In reference to the publication in our January number of the opinions held at certain ports on this subject, the statement as regards Hull, on page 87, requires modification, and should run as follows:—"That there appears to be no objection, legally or otherwise, to a competent third mate holding a second or higher grade certificate, taking charge of a watch or of the bridge in a steamship, if the Master approve the same."

Quick Passage from Sydney to San Francisco.—On a recent trip the steamer, *City of Sydney*, 3,000 tons, Captain Dearborn, made the fastest steaming time on record between Sydney and San Francisco. She was just 628 hours (26 days, 4 hours) *en route*, including stoppages, and landed the mails 2½ days ahead of time. —*New York Maritime Register.*

TIDE TABLES FOR FEBRUARY, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge.		Hull.		North Shields.		Leith.		Devonport.		Dover.		Weston-super-Mare.		Liverpool.		Greenock.		Queenstown.		Kingstown.		Londonderry.		Brest.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	8 0	8 32	0 29	1 2	10 3	10 41	8 55	9 35	11 33	—	5 8	5 42	0 19	0 55	5 19	6 0	5 59	6 36	11 21	—	5 23	5 59	2 40	3 19	10 18	11 2
S	2	9 10	9 59	1 39	2 18	11 22	—	10 17	10 57	0 10	0 51	6 20	7 1	1 37	2 21	6 46	7 30	7 17	8 0	0 3	0 46	6 38	7 18	3 57	4 34	11 46	—
M	3	10 43	11 28	2 57	3 30	0 4	0 42	11 35	—	1 34	2 16	7 43	8 23	3 5	3 49	8 10	8 48	8 42	9 22	1 29	2 11	7 56	8 33	5 6	5 37	0 30	1 9
Tu	4	—	0 2	4 13	4 40	1 18	1 47	0 12	0 41	2 58	3 39	8 58	9 26	4 27	4 59	9 20	9 45	9 55	10 22	2 46	3 14	9 7	9 35	6 2	6 25	1 42	2 9
W	5	0 34	1 3	5 12	5 34	2 11	2 33	1 5	1 28	4 10	4 38	9 50	10 14	5 28	5 55	10 7	10 28	10 47	11 11	3 41	4 5	10 1	10 23	6 48	7 10	2 32	2 54
Th	6	1 26	1 48	5 55	6 16	2 54	3 13	1 50	2 10	5 2	5 25	10 37	10 59	6 19	6 43	10 49	11 10	11 34	11 56	4 28	4 49	10 42	11 1	7 32	7 53	3 15	3 35
F	7	2 8	2 28	6 37	6 58	3 32	3 51	2 30	2 49	5 47	6 9	11 21	11 43	7 4	7 24	11 30	11 50	—	0 18	5 10	5 31	11 20	11 39	8 12	8 30	3 55	4 15
S	8	2 47	3 5	7 18	7 38	4 10	4 30	3 7	3 26	6 31	6 52	—	0 5	7 44	8 3	—	0 10	0 38	0 58	5 51	6 11	11 58	—	8 48	9 6	4 35	4 54
S	9	3 24	3 44	7 58	8 18	4 50	5 10	3 45	4 4	7 12	7 32	0 26	0 48	8 22	8 41	0 30	0 50	1 18	1 38	6 31	6 51	0 18	0 38	9 24	9 42	5 13	5 32
M	10	4 3	4 23	8 38	8 58	5 30	5 50	4 24	4 45	7 52	8 12	1 10	1 31	9 0	9 19	1 9	1 28	1 58	2 18	7 11	7 31	0 58	1 19	10 1	10 20	5 51	6 11
Tu	11	4 44	5 3	9 18	9 38	6 11	6 32	5 6	5 27	8 32	8 51	1 52	2 13	9 38	9 56	1 48	2 8	2 38	2 58	7 51	8 11	1 40	2 1	10 40	11 1	6 31	6 51
W	12	5 23	5 42	9 58	10 18	6 53	7 14	5 49	6 11	9 10	9 29	2 34	2 55	10 13	10 29	2 28	2 48	3 18	3 38	8 30	8 49	2 22	2 44	11 24	11 51	7 12	7 34
Th	13	6 3	6 26	10 40	11 0	7 37	8 5	6 34	7 0	9 50	10 12	3 16	3 38	10 48	11 10	3 8	3 32	3 58	4 21	9 10	9 35	3 7	3 32	—	0 23	7 59	8 25
F	14	6 51	7 18	11 38	—	8 35	9 10	7 30	8 7	10 34	11 2	4 3	4 36	11 37	—	3 58	4 29	4 47	5 16	10 3	10 34	4 0	4 34	1 0	1 41	8 55	9 31
S	15	7 48	8 25	0 14	0 58	9 51	10 37	8 48	9 31	11 34	—	5 1	5 39	0 10	0 51	5 8	5 55	5 50	6 30	11 16	—	5 14	5 55	2 28	3 14	10 14	11 4
S	16	9 7	9 58	1 35	2 19	11 23	—	10 18	11 3	0 15	1 1	6 21	7 8	1 39	2 28	6 48	7 37	7 18	8 7	0 5	0 59	6 39	7 24	3 58	4 39	11 55	—
M	17	10 46	11 33	3 3	3 40	0 9	0 51	11 44	—	1 47	2 33	7 55	8 35	3 16	4 2	8 21	9 0	8 53	9 34	1 40	2 21	8 6	8 46	5 14	5 47	0 41	1 21
Tu	18	—	0 12	4 25	4 57	1 28	1 57	0 23	0 51	3 17	3 54	9 9	9 37	4 41	5 14	9 31	9 55	10 7	10 35	2 59	3 28	9 19	9 48	6 11	6 35	1 54	2 20
W	19	0 46	1 12	5 22	5 48	2 21	2 42	1 15	1 37	4 23	4 49	10 1	10 23	5 41	6 4	10 17	10 37	10 58	11 20	3 51	4 11	10 11	10 30	6 57	7 19	2 42	3 2
Th	20	1 35	1 57	6 3	6 23	3 1	3 20	1 58	2 17	5 11	5 33	10 45	11 5	6 27	6 48	10 56	11 14	11 42	—	4 36	4 54	10 48	11 5	7 39	7 58	3 22	3 40
F	21	2 17	2 34	6 43	7 2	3 37	3 54	2 35	2 52	5 52	6 10	11 25	11 43	7 7	7 24	11 32	11 49	0 2	0 21	5 12	5 30	11 22	11 39	8 15	8 30	3 57	4 14
S	22	2 50	3 5	7 18	7 34	4 10	4 26	3 7	3 22	6 27	6 44	—	0 1	7 41	7 57	—	0 0	0 38	0 55	5 47	6 4	11 55	—	8 45	8 59	4 31	4 46
S	23	3 21	3 36	7 50	8 6	4 42	4 58	3 38	3 53	7 1	7 14	0 19	0 35	8 12	8 26	0 22	0 38	1 12	1 28	6 20	6 35	0 11	0 27	9 13	9 27	5 1	5 16
M	24	3 52	4 6	8 21	8 36	5 13	5 28	4 8	4 23	7 27	7 40	0 51	1 7	8 40	8 53	0 53	1 7	1 43	1 58	6 49	7 3	0 42	0 57	9 41	9 54	5 31	5 45
Tu	25	4 21	4 35	8 50	9 4	5 43	5 58	4 38	4 52	7 53	8 6	1 22	1 37	9 6	9 19	1 21	1 35	2 12	2 26	7 17	7 31	1 12	1 26	10 7	10 20	5 59	6 13
W	26	4 49	5 3	9 18	9 33	6 13	6 28	5 7	5 22	8 19	8 32	1 52	2 7	9 32	9 45	1 49	2 3	2 40	2 54	7 45	8 0	1 41	1 56	10 35	10 51	6 27	6 42
Th	27	5 18	5 32	9 48	10 4	6 43	7 0	5 38	5 56	8 46	9 0	2 23	2 40	9 58	10 11	2 18	2 33	3 8	3 22	8 15	8 30	2 12	2 30	11 9	11 31	6 57	7 15
F	28	5 47	6 5	10 22	10 42	7 18	7 40	6 15	6 36	9 15	9 31	2 57	3 15	10 23	10 44	2 49	[illegible]	3 33	3 57	8 47	9 7	2 48	3 8	11 57	—	7 35	7 57

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*. − *sub*.), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 58	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 10	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 48	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 6, *Lord Street, Liverpool, and* 323, *High Holborn, London, W.C.*

ENGLISH (APPLICATIONS).

5203. Luke Thomas, Bayswater. "Improvements in rudders."

5208. John Joseph Frederick Andrews, New Cross, Naval Architect. "Improvements in ships and vessels to render them unsinkable."

5210. William Grise, Paris. "An undersea torpedo rocket."

5286. James Scott and John Hutton Riddel, Glasgow, Engineers, "Improvements in the construction of anchors for ships or vessels, and in the modes and means of housing or securing them thereto."

5298. Carl Hülster, New York. "Improvements in ships."

5319. Joseph Goodrich, — Henry, Illinois, U. S. "Improvements in mechanical movements or apparatus adapted to the propulsion of vessels, and also as a mill power, and as a blower, and to other useful purposes."

1879.

11. Thos. Robert Brailsford and Charles Wood, Trinity Square, London. "Improvements in ships' lamps."

15. Margaret Jane Courtenay, Idlewild, Cornwall, on the Hudson, U.S. "Improved means for utilising the rise and fall of the tide as motive power."

16. Joseph Corduan, Brooklyn, U.S. "An improved method of, and apparatus for, preserving the equilibrium of beds, seats, and the like, chiefly designed to be employed in ships for the prevention of sea sickness."

67. John Davidson, Glasgow. "Improvements in 'lower' or 'slip' bolts for fastening the doors of houses, magazines, portholes, and other analogous purposes."

108. Seth Whittier and Albert Rufus Whittier, Mass. "Improvements in anchors for navigable vessels."

121. Thos. Summers and Arthur James Day, of Day, Summers & Co., of Northern Iron Works, Southampton. "Improved

combination of appliances for hauling vessels on slip-ways, inclined planes, and other similar surfaces."

129. Herbert George Huxley, Brixton, and Moses Blok, Finsbury. "Improvements in the propulsion of marine torpedoes."

ABRIDGEMENTS.

2047. Edmund S. Hunt, Weymouth, Mass., U.S. "Improved apparatus for use in case of shipwreck to effect communication between the wreck and the shore, and for other like purposes." Consists of a projectile comprising a powder charge, and a shot attached to a case containing a compact coil of rope packed with paraffin. A compactly finished hand coil is used in combination. The projectile is placed in the gun, and the line joining the ends of the coil in the shot case and the hand coil, is supported on a bracket so as not to lie across the muzzle of the gun, and be hurt by the explosion. The hand-coil is placed with its mouth facing the ship, the charge fired and the shot-coil flies over the ship, uncoiling itself as it proceeds.

2227. Jas. Watson and Leonard Watson, of Sunderland, Engineers. "Improvements in steam steering apparatus." This comprises a steam cylinder bolted horizontally to a frame, and the piston rod carrying a cross head fitted with sheaves in which the tiller chains engage. V shaped slides control the admission of steam to the cylinder, the valve is reversed by means of a twisted rocking shaft operated by the crosshead, and working the valve by an eccentric. The valve is also actuated by a handle wheel operating it by suitable gearing.

3116. Gilles Louis de Maupeon d'Ableiges, Cherbourg. "Improvements in the mode of and apparatus for removing cinders, scoriæ, clinkers, and other waste materials, from steam and other ships." This consists in sending the ashes into a hopper fitted with grinding rollers; as the stuff is ground it is mixed with water by injected jets. The stuff then falls into a pump, from which it is sucked up and discharged overboard by a reciprocating plunger, fitted with suitable valves.

FRANCE.

124994. Dressler. "A construction of vessels."

124965. Jenkins. "A speed regulator for steam engines."

124948. Joselli. "A drag."

125036. De Maupeon d'Ableiges, of Cherbourg. "An apparatus for removing coal dust from the hold of vessels."

125052. Viry. "A signal."

125110. Vence and Constant, of La Crotat. "Jointed chairs for vessels."

125305. Stephany. "A chain boat."

125289. Hooper. "Life rockets."

125318. Mesny. "Improved arrangements for life-belts, whereby they are rendered also available as pillows."

GERMANY.

4013. D. McColgan, San Francisco. "An adjustable ram for ram-boats and ships."

ITALY.

2. F. Balzamo, Sorrento. "A buoy for vessels."

24. L. Le Guénédal. "Fixing a distress rudder in the open sea."

44. J. L. Lay, Paris. "Improvements in torpedo boats, and An apparatus for guiding, regulating, and firing the same."

88. G. V. Fosbery, London. "Protecting gunboats, torpedo boats, and other similar boats from bullets and other projectiles."

121. The Chantillon and Commentry Ironworks Company, France. "Manufacturing armour plates."

139. E. Pedcazzini, Santa Cristina, Pavia. "A steam rudder."

136. H. Origlio and H. Carvero, Genoa. "An apparatus for steadying rudders."

AMERICAN.

209541. Luther Alvord, South Hadley, Mass. "Chain wheel propeller and canal boat." This consists in two wheels placed at the stern on each side, having their spokes set at an angle to their axis. The links of the chain are formed with ribs or blades set at an angle likewise. The lengths are pivoted together with eccentrically pivoted links so that the chain, though flexible in one direction, acts solidly on the water, and cannot slip on the recessed peripheries of the wheel. A baffle board at the stern can be set at an angle to project into the water, and counteract the tendency of the wheels to elevate the bow. A moveable false bow is used to

receive and deaden the effect of the reflex wave made by the bow of the boat. Baffle boards prevent the side wash from reaching the banks.

207018. Samuel Hy. Cowles and Benjamin Barton Brewer, Sacramento. "Device for propelling vessels." This consists of a set of pipes opening into the water at the stern of the vessel, two pointing forward and two aft, one on each side, and a sternward pipe. Water is pumped through pipes in the bottom furnished with suitable valves, and ejected through the pipes to propel the vessel, controlling valves determining the action of the jets so that the vessel may be propelled and steered in various directions.

209364. Lewis Smith and Robert Booth, Sherbrooke, Quebec. "Fog alarms." This consists of a steam cylinder, bolted over an air cylinder, provided with a fog-horn. Steam is admitted to raise the piston of the steam cylinder, and both pistons being on the same rod, fall by their own gravity on steam being cut off. A semi-rotary balanced shaft, with cams, operates a lever to open and close the induction valve, and the eduction valve is controlled by another lever working with a pin in the slot of the first-named lever. The shaft is revolved by the action of tappets in each cylinder-head, struck by the pistons working a pivoted arm to push it partly round each way.

209414. Jos. W. Norcross, Boston. "Vessels." This consists in a peculiar vessel with two hulls, the upper part being curved like a fish's back. The bottom of each hull is angular, and projects deeper outside than between the hulls, so as to take a hold of the water. Two masts are used, one in each hull, and a peculiar sail which can be shifted from one mast to the other, so as to be always set to windward; the sail is fitted to a gaff and boom pivoted centrally to the mast, and supported by rod or staff at its fore end, connecting boom and gaff together, they being pivoted to it.

78. John Brown Herreshoff and James Brown Herreshoff, Bristol, U.S. "An improved method of propelling and steering steam vessels, and apparatus therefor and connected therewith."

100. Henry Robertson, Gosport. "Improvements in davits for ships and other vessels."

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
33	England	To distinguish the marking of wrecks.
34	„ South Coast—Portsmouth	New harbour light.
35	„ Bristol Channel — Bull Point and Bideford	New light; and change in old light.
36	White Sea—Arkhangel—Zimnia	New light.
37	France—North Coast—Canche River—Carniers	Lights not available as leading lights.
38	„ West Coast—Glenan Isles—Ile aux Moutons	New light.
39	Spain—South Coast—Huelva	New buoys.
40	Mediterranean—France—Port Nouvelle	Temporary light on South Mole.
41	„ Corsica—Port Propriano	New light on pier.
42	„ Italy — Spezia Breakwater	Light-vessel altered in position.
43	Adriatic—Italy—Port Monopoli	New light on Mole Head.
44	„ Cazza Islet—Gradisca Point	New light.
45	„ Curzola Channel—Port Pedoccio	Alteration of harbour light.
46	„ Cattaro Gulf—Port Risano	Light shown occasionally.
47	Mediterranean—Patras Gulf — Cape Papas	Temporary discontinuance of light.
48	India—Bay of Bengal—Cocanada—Vakalapudi	Cocanada light extinguished, and new light at Vakalapudi.
49	Australia—S. Australia — Investigator Strait—Althorpe Island	New light.
50	United States — Georgia — St. Mary River	New channel.

NAUTICAL NOTICES.

33.—England.—*Marking of Wrecks.*—It being desirable when light-vessels or other craft are anchored to mark the position of wrecks, that mariners should be able to distinguish them, and to learn on which side of them they should go, wreck-marking vessels will in future have their top-sides colored *green*, and will exhibit—

By Day—Three balls on a yard 20 feet above the sea; two placed *vertically* on the side on which navigating vessels may safely pass, and one on the other side.

By Night—Three *white fixed* lights will be shown similarly

arranged, but not the ordinary riding light. Mariners will thus know, on sighting a wreck-marking craft, that she is so employed; and that they should pass on that side of her on which the two balls or two lights are shown.

34.—ENGLAND.—*South Coast.—Portsmouth Harbour.—Harbour Light on South Railway Jetty, Portsmouth Dockyard.*—The light is exhibited from the extreme south end of the south railway jetty; it is *fixed* light, showing *red* between the eastern side of the harbour and the south-east tangent of Block House fort; and *green* up the harbour westward of that line.

Note.—Vessels going alongside the south end of the dockyard at night, will be clear of the harbour railway works when within the limits of the green light. *Variation*, 18° *E.*

35.—ENGLAND.—*West Coast.—Bristol Channel.—New Lighthouse on Bull Point, and improvement of Bideford High Light.*—The lighthouse which has been for some time past in course of erection on Bull point, south side of the Bristol Channel, being now far advanced towards completion, it is intended during the ensuing summer to exhibit therefrom at an elevation of 154 feet above high water, a powerful *white triple-flashing half-minute light*, showing *three successive flashes* of about *two seconds'* duration, divided by eclipses of about three seconds, the *third flash* being followed by *an eclipse of about* 18 *seconds.* Also a *red fixed light* will be shown from the lighthouse, 18 feet below the upper light, to mark the Morte stone. A powerful *fog-signal*, giving *three blasts* in quck succession every *two minutes*, will also be established.

Note.—The illuminated arc of the *Bideford high light* will be extended, when the light at Bull point is established. Further particulars will be published.

36.—WHITE SEA.—*Gulf of Arkhangel.—Fixed and Flashing Light on Zimnia Hills.*—A lighthouse (Zimnegorski) is erected on Zimnia hills, right bank of Kammeni river, the light is *fixed* and *flashing*, showing a flash every *thirty seconds*, elevated 349 feet above the sea, and visible from seaward between the bearings S. 27° W. and N. 21½° W. from a distance of 21 miles. The lighthouse, 61 feet high, octagonal in shape, built of wood and painted yellow, with lantern of lead colour, is situated about 260

yards from the shore. Position as given, lat. 65° 28′ 15″ N., long. 39° 44′ 20″ E. *Variation*, 5½° E. *in* 1878.

37.—FRANCE.—*North Coast.—Canche River Entrance.—Carniers Lights.*—Consequent on the changes in the channel, the lights exhibited on Carniers sand hills, north side of entrance to Canche river, *are no longer available as leading lights.* These lights in line now lead over Touquet bank, and are maintained only for the use of the fishermen of Etaples.

38.—FRANCE.—*West Coast.—Glenan Islands.—Light on Isle Aux Moutons.*—From a lighthouse recently erected, the light is *fixed*, showing *red* through an arc of 60°, between the bearings S. 19½° E. and S. 79½° E. (over the dangers included between les Poulains and Karekgrèis); *green* through an arc of 31°, between S. 79½° E. and N. 69½° E. (indicating the position of Basse Rouge Shoal); *white* over the fairway of the channel, through an arc of 22° between N. 69½° E. and N. 47½° E.; *red* through an arc of 96°, between N. 47½° E. and N. 48½° W. (covering the dangers between Bluiniers and Basse Jaune shoals); and *white* between N. 48½° W. and S. 19½° E. The white light should be visible from a distance of 12 miles; the red, 8 miles; and the green, 7 miles; elevation 59 feet above high water. The lighthouse, 49 feet high, is a square brick tower with dwelling attached. Position, lat. 47° 46′ 30″ N., long. 4° 1′ 50″ W. *Variation*, 19½° *W.*

39.—SPAIN.—*South Coast.—Buoys on Huelva Bar.*—Two *red* conical buoys have been placed in the western part of the mouth of the Odiel river, Huelva bar. The first buoy is on the most salient part of the Picacho de Poniente (the west bank of the bar), in 2 fathoms at low springs, with the keeper's house (Casa de los torreros) bearing N. 16° 50′ W., and the custom-house N. 26° 40′ E. The second, showing about 3 feet above water, is on the extremity of the inner angle of the west bank of the bar, in 10 feet at low springs, with the keeper's house (Casa de los torreros) bearing N. 26° 20′ W. and the custom-house N. 55° 40′ E. *Variation*, 20° 40′ *W.*

40.—MEDITERRANEAN.—*France.—Port Nouvelle.—Temporary Light on South Mole Head.*—A *fixed white* light, elevated 11 feet

above the sea, is shown from a post at the extremity of the South mole, now in course of construction at port Nouvelle. This temporary light and the harbour light (fixed white) indicate the direction (south-easterly) in which the mole is being extended; it is now 200 yards in length, and is intended to be carried 60 yards further seaward.

Note.—In very bad weather, when this temporary light cannot be shown, a *fixed red* light will be exhibited from the lighthouse 21 feet below the harbour light. Mariners should enter port Nouvelle with caution, and not approach too closely the works in progress of the Southern mole, which should be left on the port hand.

41.—MEDITERRANEAN.—*Corsica Island.—Valinco Gulf.—Harbour Light at Port Propriano.*—It is shown from a brick tower recently erected on the extremity of Scoglio Longo pier; the light is *fixed red*, elevated 34 feet above the sea, and visible between the bearings N. 78½° E. (through south) and S. 78½° W., from a distance of 10 miles. A faint light will be also visible over the harbour properly called Propriano. Position, lat. 41° 40′ 45″ N., long. 8° 53′ 45″ E.

42.—MEDITERRANEAN.—ITALY.—*West Coast.—Gulf of Spezia Breakwater.—Alteration in Position of Eastern Light-vessel.*—A mole having been built which extends 87 yards from Santa Teresa point in the direction of the breakwater, the following alteration has been made in the position of the light-vessel placed in the East channel:—It is now moored 306 yards westward of Santa Teresa point, thus leaving a channel about 220 yards in breadth between this new mole and the light-vessel.

43.—ADRIATIC.—ITALY.—*Light at Port Monopoli.*—A *fixed white* light is now shown from the mole head.

44.—ADRIATIC.—*East Coast.—Cazza Islet.—Light on Gradisca Point.*—A light is provisionally exhibited from a lighthouse recently erected on the extreme south-west point of Cazza islet. It is a *fixed red* light, elevated 308 feet above the sea, and visible through an arc of 270°, between the bearings N.W. by W. and S.W. by S., from a distance of 14 miles. The lighthouse, painted red and white in vertical stripes, rises from the centre of the dwelling house, which

is of one story. Position, lat. 42° 45′ N., long. 16° 29′ 10″ E. *Variation*, 10° *W.*

45.—Adriatic.—*Curzola Channel.—Port Pedoccio.—Alteration in Harbour Light.*—To distinguish it from other lights in the town, the harbour light (fixed red) exhibited on the mole head at port Pedoccio, north side of Curzola island now shows a sector of *green* light towards the port, and likewise towards Curzola channel.

46.—Adriatic.—*Gulf of Cattaro.—Risano Bay.—Harbour Light at Port Risano.*—Exhibited on the arrival of steam-vessels and during dark nights, from an iron standard on the new mole head; it is a *fixed red* light, elevated 18 feet above high water.

47.—Mediterranean.—*Gulf of Patras.—Temporary Discontinuance of Cape Papas Light.*—Discontinued in consequence of damage to the lighthouse by recent gales; and until the re-exhibition of this light, vessels entering or leaving the gulf at night should be guided by the fixed white light shown on Sosti island, North side of Entrance of the gulf.

48.—India.—*Bay of Bengal.—Godavery District.—Cocanada.—Intended Light at Vakalapudi.*—Owing to the extension of the mud deposits from the Godavery river and the consequent removal of the anchorage to the northward, the light shown on the north side of the entrance to the Cocanada river was of little use, hence on and after the 15th of January, 1879, this light would be extinguished, and a new light exhibited at Vakalapudi, which lies 4·6 miles N. by E. $\frac{7}{8}$ E. from the present lighthouse. It will be a *revolving white* light, showing a *flash* every 20 *seconds*, elevated 80 feet above high water, and visible 14 miles in every direction seaward. Position, lat. 17° 0′ 40″ N., long. 82° 16′ 30″ E. *Variation*, 2° *E.* Further notice will be given.

49.—Australia.—South Australia.—*Investigator Strait.—Light on Althorpe Island.*—On and after the 14th day of February, 1879, a *revolving* light, *flashing every fifteen seconds*, will be exhibited from a light tower, painted white, and 40 feet in height, erected on the large Althorpe island. The light will be *white*, except between the bearings from the lighthouse, of N. 25° W. and N. 61° W., where a *red* sector will be shown, leading half-a-mile to the eastward of Emmes Reef, and nearly half-a-mile southward of the

S.W. rock; elevation, 350 feet above the sea. The white light should be visible about 25 miles, and the red light about 17 miles; but when much refraction exists, both lights may be seen at a greater distance.

50.—United States.—*Georgia.—New Channel at Entrance to St. Mary River.*—The new channel has broken across the shoals at the mouth of St. Mary river, Georgia, and entrance to Fernandina harbour, Florida: it is about three-fourths of a mile northward of the old channel, and has a depth of 11 feet at mean low water. The outer entrance has been marked by a can buoy, painted black (No. 1); from this buoy the North Range Front beacon bears S. 77° W., and the course from this buoy is W. ½ S., one-third of a mile to a nun buoy (black, No. 3). The channel then widens rapidly and deepens. Another buoy (red can, No. 2) is placed on the South-east point of the "North Breakers." Course from No. 3 to No. 2, W.S.W. After passing No. 2 the course is West until opposite Fort Clinch, when it may be shaped either for St. Mary's or for the anchorage.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1878.

(*This List is competed to the* 18*th of each Month.*)

329. *Reaper*, brigantine; built of wood at New Brunswick, 1874; owned by Thomas Kearon; tonnage 352; Liverpool to Dublin; coals; foundered whilst in tow of a steam-tug, and all hands lost, October 7, 1878. Inquiry held at Liverpool, November 26, 1878, before Raffles, Stip. Mag. Forster and Wilson, N.A. Court found that the vessel had been taken to sea in an unseaworthy condition.

339. *Helvetia*, s.s., and *Fanny*, coastguard cruiser; the former built of iron, at Jarrow, 1864; owned by the National Steamship Company; tonnage, 4,587; Liverpool to New York; cargo and passengers; the latter a yawl-rigged vessel of 153 tons, doing duty as a coastguard cruiser; Queenstown to Kingstown; stores: in

collision off the Tuskar, October 31, 1878, whereby the *Fanny* was lost, and 17 of the crew drowned. Inquiry held at Liverpool, November 30, 1878, before Rothery, Wreck Commissioner. Grant and Parfitt, N.A. Master of the *Helvetia* in default for not keeping a proper look-out on board his vessel, and for not reversing the engines when starboarding his helm. Certificate suspended for six months.

342. *Luna*, s.s.; iron; built at Newcastle, 1857; owned by Wm. J. Branfoot and others; tonnage, 477; London to the North; ballast. Damage done through wheel-chain breaking and subsequent collision with the s.s. *Westminster* and a barge in the River Thames, on November 9, 1878. Inquiry held at Westminster, November 25, 1878, before Rothery, Wreck Commissioner. Harris and Holt, N.A. Breaking of wheel-chain due to a defect of which master was unaware. Collision unavoidable. Certificate returned.

343. *Ono*, schooner; built of wood, at Prince Edward Island, 1838; owned by S. Roach, of St. Ives; tonnage, 156; Plymouth to Cardiff; ballast; abandoned off the Lizard, November 9, 1878. Inquiry held at Falmouth, December 4, 1878, before Bennetts and Newman, J.P. Powell and Castle, N.A. Abandonment justifiable. Master's certificate returned.

Smithfield, schooner; built of wood, at Aberdeen, 1842; owned by Daniel Mearns and others; tonnage, 165; Aberdeen to London; stone; lost on the Hasboro' Sands, October 28, 1878. Inquiry held at Aberdeen, December 4, 1878, before Thomson and Cadenhead, J.P. Burnett and Ward, N.A. Casualty due to the blameworthy conduct of mate (uncertificated) and crew. Master's certificate returned with a caution.

349. *Farnley Hall*, s.s., and *Morna*, s.s.; the former built of iron at West Hartlepool, 1871; owned by Robert Irvine and others; tonnage, 606; Baltic to London; wood and iron; the latter also built at West Hartlepool, 1869; owned by the London and Edinburgh Shipping Company; tonnage, 544; trading between Leith and London; in collision in Limehouse Reach, River Thames, November 10, 1878. Inquiry held at Westminster, December 18, 1878, before Rothery, Wreck Commissioner.

Forster and Castle, N.A. Casualty due to the wrongful act of the pilot on board the *Morna*, which, being an overtaking vessel, did not keep out of the way of the *Farnley Hall*, and on approaching her, neglected to slacken her speed and to stop and reverse.

Gerassimo Cupa; wood; built at Syra, 1871; owned by Thomas Hill and others, of Belfast; tonnage, 221; Liverpool to Galveston; salt; abandoned off Cape Finisterre, August 30, 1878. Inquiry held at Liverpool, December 21, 1878, before Raffles, Stip. Mag. Aplin and Wilson, N.A. Vessel prematurely abandoned. Master's certificate suspended for twelve months.

352. *Gem*, s.s., and *Bowfell;* the former a paddle-steamer, built at Govan, 1858; owned by the Wallasey Local Board; tonnage, 86; used as a ferry on the Mersey; the latter built of iron at Whitehaven, 1864; owned by Messrs. Brocklebank; tonnage, 1,001; Calcutta to Liverpool; light cargo; in collision in the River Mersey, on November 26, 1878, whereby loss of life ensued. Inquiry held at Liverpool, December 10 to 14, 1878, before Rothery, Stip. Mag. Aplin and Jones, N.A. Casualty due to default of master of *Gem* attempting to cross the river in dense fog and with a strong tide running.

Anglo Saxon, barque; built of wood at Sunderland, 1854; owned by Mr. E. G. Price and others, of London; tonnage, 693; Dublin to St. Lawrence; ballast; abandoned at sea, October 17, 1878. Inquiry held at Liverpool, December 18, 1878, before Raffles, Stip. Mag. Aplin and Wilson, N.A. Master justified in abandoning the vessel. Certificate returned.

354. *Richmond*, s.s.; iron; owned by Dixon and Harris, of London; tonnage, 694; Penarth to Malta; coals; abandoned off Finisterre, November 24, 1878. Inquiry held at Cardiff, December 20, 1878, before Rothery, Wreck Commissioner. Powell and Castle, N.A. Casualty due to explosion of accumulated coa gas. Master neglected to use means provided for ventilating the holds. Certificate suspended for six months, but recommended for one as mate during that period.

355. *Nelson*, brigantine; built of wood, at Prince Edward Island, 1872; owned by James Madge and others, of Swansea; tonnage, 259; Swansea to Cape Verde Islands; coals; abandoned

at sea, October 20, 1878. Inquiry held at Swansea, December 19, 1878, before Fowler, J.P. Visconti and Jones, N.A. Abandonment premature, and not justified; master censured, but his certificate returned.

357. *Gipsy Queen*, schooner; built of iron in the Clyde, 1877; owned by Henry Lamont and others of Glasgow; tonnage 313; West Indies to Newcastle; guano; stranded on Kimmeridge Ledge, County of Dorset, December 2, 1878. Inquiry held at Glasgow, December 31, 1878, before Hamilton and McCulloch, J.P. Hight and Forster, N.A. Master in default for not keeping a proper look-out, and for not using the lead sufficiently when in close proximity to the land, and in very hazy weather. Certificate suspended for six months; recommended for one as mate during that time.

358. *Pawashick*, barque; built at Prince Edward Island, 1869; owned by Edwin Fry, Liverpool; tonnage, 359; Cardiff to Barcelona; coals; stranded on the Nash Sands in the Bristol Channel, December 5, 1878. Inquiry held at Cardiff, December 21, 1878, before Rothery, Wreck Commissioner. Powell and Castle, N.A. Vessel kept too long on one course. Casualty due to the pilot in charge who was asleep in the cabin when he ought to have been on deck.

Official Inquiries Abroad.

Will Watch, ketch; capsized in a squall, outside Sydney heads. Inquiry held at Sydney. No evidence to found a charge against master.

Jean, brigantine; lost in Table Bay, July 19, 1878. Inquiry held at Cape Town, July 29, 1878. Master guilty of great want of judgment. Severely censured. Certificate returned.

Redbreast, barque; lost in Table Bay, July 20, 1878. Inquiry held at Cape Town, November 8, 1878. Loss of vessel not attributable to the fault of either master or mate. Certificates returned.

Sharperton, barque; stranded off the Eastern Lacepede Island, August 20, 1878. Inquiry held at Lacepede Islands, August 23, 1878. Casualty due to careless navigation on the part of the master. Certificate returned to him with a severe censure.

Annie Taylor, schooner; stranded off Port Sinclaire, September 28, 1878. Inquiry held at Adelaide, October 19, 1878. Master in default in rounding to when he had a good offing, and in not waiting for daylight. Certificate suspended for three months.

Bright Star, schooner; stranded in Stranger's Cay, Abaco, October 4, 1878. Inquiry held in the Bahamas. Master exonerated from blame.

Flying Scud; lost. Naval court held at Newchwang, October 4, 1878. No blame attached to master.

Sydney, barque; lost off Shortland Island, Solomon Group. Inquiry held at Sydney, October 7, 1878. No evidence adduced to found charge against master.

Storm Bird, ketch; stranded in Yaukalla Bay, October 14, 1878. Inquiry held at Adelaide. No blame attached to master or mate.

Glen Osmond, barque; stranded on Great Sandy Point (Long Spit), St. Vincent, October 15, 1878. Inquiry held at Adelaide. Casualty due to the breaking of the windlass, and the whole of the starboard chain running out. Master seems to have used every exertion for safety of ship.

Bannockburn, ship; stranded 20 miles from Aden, October 2, 1878, when loss of life ensued. Inquiry held at Aden, October 17, 1878. No blame attached to master or mate. Current set the vessel out. Every exertion made to save the men when the boat capsized.

Onward, barque; lost on Bampton Shoal, New Hebrides Group, September 15, 1878. Inquiry held at Sydney, October 24, 1878. In the absence of the master and most of the crew (who were missing) no decision was arrived at.

Ocean Belle, barque; lost at the mouth of the River Chittagong, September 26, 1878. Inquiry held at Chittagong, October 29, 1878. Considerable blame attached to master, but Court took a lenient view and did not suspend his certificate.

Pandora, ship; lost on the Island of Monos, October 18, 1878. Inquiry held at Trinidad, November 8, 1878. No blame attached to master.

Sicilian, s.s.; stranded on Nantucket Shoal, November 3, 1878.

Inquiry held at New York, November 16, 1878. Master guilty of culpable negligence. Severely censured and admonished.

Souvenir, s.s.; lost near St. Ann's Bay, Jamaica, September 27, 1878. Inquiry held at Kingston, Jamaica, November 23, 1878. Master in default. Certificate suspended for six months.

Eskbank, barque; lost on the reefs near Waitsiki Diamond Head. Naval Court held at Honolulu, November 23, 1878. Casualty due to an error of judgment on the part of the master.

City of Dublin, ship; lost. Naval court held at Portland, Oregon, November 27, 1878. Master's certificate returned, with a caution.

John Bramall, s.s.; stranded on the Little Gull Island rocks, October 18th, 1878. Inquiry held at New York, November 29, 1878. Master in default. Certificate suspended for six months.

Atalanta, barque; dismasted, October 17, 1878. Inquiry held at Antigua, November 30, 1878. Casualty due entirely to stress of weather.

Cassiopeia, barque; stranded at the mouth of the River Slobregat, November 25, 1878. Naval Court held at Barcelona, December 8, 1878. No blame attached to master.

Barbara Taylor, schooner; lost, September 20, 1878. Naval Court held at Nagasaki. Casualty due to an error of judgment. Master reprimanded.

Arabia, ship; dismasted in a typhoon. Naval Court held at Amoy. No blame due to master. Certificate returned.

GENERAL.

Rocket Apparatus Service.—Five Lives Saved.—Youghal, 25th December, 1878.—The brigantine *Confidence*, of Cardigan, bound from Swansea to New Ross, owing to the master having mistaken Youghal Harbour for Kinsale, the weather having been very thick at the time, came ashore on Youghal Sands. The rocket party, who had to work up to their waists in water, and at considerable risk to their lives, owing to the heavy sea and pieces of floating wreck, succeeded in rescuing all hands by means of the apparatus.

Rocket Apparatus Service.—Five Lives Saved.—Filey, December 26th, 1878.—The schooner *Dolphin*, of Krageroë, bound for Scarborough, came ashore on Filey sands this morning, having mistaken Filey gas lights for Scarborough pier light, owing, as it is stated, to the thick snow falling at the time. The rocket party, notwithstanding the slippery state of the ground, were soon on the spot with the apparatus, and succeeded in throwing a rocket line over the vessel; but the crew, it appears, partly from ignorance, and partly from exhaustion and fright, did not haul the whip off for more than two hours, but as soon as they had done so, they were all speedily rescued by the apparatus, except the master, who remained by the vessel till the tide receded.

Rocket Apparatus Service.—Six Lives Saved.—St. Mary's, Scilly, December 31st, 1878.—The brigantine, *Minerva*, of St. Malo, bound from Swansea to Cadiz, owing to stress of weather and injury to her mainsail, came ashore here. Her crew, seven in number, were all saved; one, who jumped overboard, by a shore boat, and the other six by the rocket apparatus, which was worked in a most praiseworthy manner, under the direction of Daniel McIntyre, commissioned boatman in the Coast Guard Service.

A New Method of Equipping of Armed Vessels, and of Traversing and Training of Ordnance, Proposed by Mr. George Fawcus, Shipbuilder, of North Shields.—This proposal consists of arrangements for rapidly turning guns in small spaces and in one sweep, without changing pivots, either round the bows or sterns of vessels, or from side to side amidships on the upper decks wherever an "all-round" barbette fire is required, by using an elliptical motion on two moving central pivots in straightened, dovetailed grooves, that allow the gun slide to be moved elliptically round in its own length, instead of in a circle of twice the length for its diameter. The inventor proposes also a simple lever-eccentric bar (that can also be worked automatically) to compress both ends of the slide firmly against the deck to absorb the "recoil" of the gun when fired and to control the motion of the slide, under all circumstances, instead of the "port-training bars, &c.," that cannot be used at every point of an all-round fire.

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PROTECTION VERSUS FREE TRADE.

AMONG other grave results of the existing commercial depression, the opposition which is steadily manifesting itself against the principles of Free Trade, may be classed as one of the most important. During the past month this opposition has threatened to assume a definite and somewhat practical form. On the 10th ult., a public meeting of manufacturers and merchants, presided over by Mr. Alderman Knight, was held at the Cannon Street Hotel, for the purpose of memorialising Lord Beaconsfield "to consent to a Parliamentary Inquiry or a Royal Commission with respect to the prolonged depression of trade, with the view, if necessary, of modifying our one-sided Free Trade system." In opening the discussion on this proposal, the chairman deprecated the idea that he was anxious to revert to the old system of protection. He flattered himself that he was a free-trader, and pointed out that the object of the meeting was simply to endeavour to induce the Government to cause an inquiry to be instituted with the view of discussing whether the working of Free Trade had anything to do with the present grievous distress in the country, more especially in the manufacturing districts. The worthy alderman proceeded at

some length to draw the attention of the meeting to this great commercial depression, and also to the fact that Free Trade has failed to recommend itself to other nations, as its first expounders maintained that it inevitably must do when its advantages became practically known, through the benefits which were to arise from its adoption in this country. We may here remark that this is scarcely the kind of language we should have expected from one who "flatters himself that he is a free-trader."

The general tone of the speakers who followed the chairman was clearly and decidedly in favour of imposing duties on imported manufactures, with a view to the encouragement of native industry. Indeed, the mover of the first resolution advocated the imposition of a duty on corn, as he felt convinced that the time had arrived "when the cry of the 'cheap loaf' was bosh." In his opinion such a duty would be invaluable as an aid to the poor agricultural labourer and the farmer. Bradford and Manchester, moreover, required a remedy for a state of things which brought foreign goods to this country for sale, duty free, while our own manufactures lie idle in the market. He also drew attention to the fact that, in 1877, coal, of the value of £12,000,000, was sent out of the country when it was wanted at home. As a panacea for all our commercial ills he proposed that a duty of 15 per cent. should be levied on all imported goods. This speaker sat down amidst great applause. Mr. J. H. Morley (Messrs. Morley and Powell) in seconding the resolution in favour of the appointment of a Royal Commission, said that he then had in his warehouse 6,000 pieces of American cotton and 3,000 pieces of English manufacture, and that although he could sell the former, the latter would not move. He also mentioned the fact that he had recently offered a large contract in Lancashire, which was declined at the price named, but which was readily taken up by an American house, thus leaving it to be assumed that the American system of protection is more conducive to cheap production than is the system of Free Trade adopted in our own country.

The Protectionist ideas which were aired at the Cannon Street meeting are by no means novel. They may be described as the stock fallacies which have again and again been brought forward

in opposition to Free Trade principles—which have been exploded as often as they have been brought to light—but which, under the influence of the prevailing depression, seem to spring to life as often as they are destroyed. If the result of the contest between Free Trade and Protection depended on the ordinary logic of common sense, there would be no grounds for apprehension as to the side on which the victory would rest. The whole gist of the question lies, as it were, in a nutshell. To destroy the theories of Protectionists it is merely necessary to divest them of the confused jumble of ideas with which they are invariably surrounded; their annihilation is then complete. The British silk manufacturer, for example, who has produced silk of a given quality which he cannot afford to sell at less than 12s. per yard, and who finds that French silk of similar quality is being sold in the United Kingdom at 10s. per yard, may perhaps maintain that his countrymen are acting unwisely in not giving the preference to his goods, and in not paying 12s. for that which they can obtain for 10s. As a remedy for the unfavourable state of things by which he finds himself surrounded he will propose (if he is a Protectionist) that a duty of say 5s. per yard be levied on French silk. The advantage of this scheme will be that he will be able to continue his business as a silk manufacturer—the disadvantage (of which he will wisely say nothing) will be that those who purchase silk will have to pay an extra 2s., or perhaps 3s., per yard for that particular commodity. Or, in other words, the general body of consumers will have to tax themselves in order that he may continue his particular line of business. He may perhaps ask (as did one of the speakers at the Cannon Street meeting) what is to become of him, if his business is taken away. What is he to do with his capital if the French manufacturer is to be allowed to snatch his custom from his hands? But to this the only answer is, that that is solely his concern. The chief interests at stake are not his, but those of consumers, and the latter are best served when the greatest possible amount of produce can be obtained for the least possible expenditure. The silk has to be paid for by the produce of British industry; consequently, the lower its price, the more effective is this industry rendered.

To make the truth of the free trade theory unmistakeably clear, we will suppose that a process has been discovered in France by which the best silk can be produced at a cost of sixpence per yard, and that this process is known only in France. Can the Protectionists prove to us that we should do well to continue paying 12s. per yard for British silk, in order that the British silk manufacture may exist? If not, it is quite clear that their whole contention falls to the ground. We need hardly say that we have taken the case of silk solely by way of illustration, and not as representing the actual condition of the British silk trade.

As a rule it is impossible to induce Protectionists to support their theories by anything in the shape of arguments. They generally content themselves with pointing to the different countries and British colonies in which their views have been practically adopted. The United States, France, Germany, and our Australian colonies, have all declared in favour of Protection; and they seem to imagine that it is impossible for all these countries to be on the wrong track, and that Free Trade after all is nothing better than a delusion and a snare. They ask why it is that our own country is not at present prospering under the Free Trade system, and how it comes to pass that cotton goods, for example, manufactured in the United States (a highly protected country), can be sold in the United Kingdom at a lower rate than goods manufactured in Lancashire. But the answer to all this is so simple, that it is difficult to understand how men of intelligence can allow themselves to be blinded by such facts.

On purely economical grounds there is but one case, viz.: that of what may be termed young nations—in which a system of protection can be at all justified. In such countries a protective system may sometimes assist in developing native industries, and the inhabitants may find it advisable to temporarily tax themselves with the increased prices consequent on such a system, in order to bring their own resources into play. But when this result has been achieved, or when it is found that the imposition of a protective duty fails to produce the desired effect, this justification no longer remains. Taking only these considerations into account, it may be asked why countries of this description do not abandon the

system, in due course, as, according to the economical theory, they ought to do. But in answering this question, it is necessary to consider for a moment what is the effect of the imposition of protective duties. And here again the facts are perfectly plain and unmistakeable. If, for example, a heavy duty were imposed in this country on foreign silks, the first effect of such a course would be to give a tremendous impetus to the British silk manufacture. A great rise would immediately take place in the price of silk, and large profits would be realized by those whose capital happened to be embarked in the trade at the time when the change was made. But this favourable effect would last only for a short time. Other capital would be attracted to the trade, until the profits in that particular line of business would not exceed those in unprotected manufactures, and the final result would be that the country would find itself paying an increased price for silks, while the profits of the manufacturer would fall back to the level they occupied before the duty was imposed. Now, if after this duty had been in force for a number of years, the Government determined to throw the silk trade completely open to foreign competition, the prospect for the manufacturers would indeed be a gloomy one. The effect of such a change would be the sudden extinction of a large portion of their business, and a heavy loss on the plant in which their capital was embarked.

These are the considerations which render a reversion from a system of Protection to one of Free Trade so extremely difficult. The "protected" nation cannot suddenly abandon its policy any more than the habitual opium eater can suddenly abandon his daily dose. The path towards Protection is temptingly easy—the return is difficult in the extreme. In the United States, where protected articles are to be numbered by hundreds, if not by thousands, the Government would be absolutely unable to go suddenly and completely back to a system of Free Trade. Although the adoption of such a course would bring great relief to consumers, it would simply stamp out of existence a large proportion of American manufactures, and would bring ruin upon thousands of persons engaged in them. And hence it is that the proposal to adopt even the smallest step in the direction of a protective system

is viewed in this country with so much alarm by the supporters of Free Trade.

The statement that this country is not at present flourishing under the influence of Free Trade is one which hardly calls for comment. Under the influence of that system, it has prospered during the last thirty years in a manner which has not been equalled, either in times past or present, by any other nation under the sun; and Free Traders may fairly ask their opponents to explain how this result has been achieved. We may, however, point out that Great Britain is not the only country which is now suffering from commercial depression. Times are quite as bad in the United States as they are here; while in Germany the reversion to Protection would seem to have been adopted as the last mode of resuscitating industries which threaten to altogether expire, and as a last means of adding to the steadily falling revenue of the nation. And with regard to the alleged defeat of British manufactures in British markets by foreign goods, the fact proves nothing in favour of the policy of Protection as against that of Free Trade. In the case of cotton goods, for example, it would not be surprising if the Americans eventually succeeded in underselling us to some extent in the world's market. Manufacturing the raw material in the country in which it is produced, they have a decided advantage over the British manufacturer, who has to bear the cost of carriage across the Atlantic. That they have gained anything like a firm footing in this country at present is certainly not the case. The total value of manufactured cotton imported into the United Kingdom (from all countries) in 1878 was £2,058,000; the value of that exported was £48,086,000. These figures speak for themselves.

That this country will knowingly adopt a system of Protection we do not fear in the least. The most serious grounds for apprehension are to be found in the possibility that it may be induced to impose duties on the goods of nations which practice the bounty system, or which levy prohibitive duties on British manufactures; in other words, that it may be led to adopt what is known as a retaliatory policy. The one fact which the general public have to bear in mind, in connection with proposals of this

nature, is that although retaliation may injure others, it cannot possibly benefit ourselves. We may close our markets to foreign producers, but we must remember that in so doing, although we may inflict a certain amount of damage upon our neighbours, the amount of that damage will be taken from our own pockets. If the French people think right to burden themselves with a bounty on exported French sugar, so much the better for British consumers of that commodity. If they chose to fix the bounty at a rate so high that French sugar might be purchased in this country at sixpence the hundredweight, we should have good reason to feel gratified at their generosity. British sugar refiners tell us that we ought to endeavour to raise the price of sugar by checking the importation of the French article, but it seems to us that they will experience some difficulty in converting sugar consumers to this opinion.

It must be remembered that any step, however small, in the direction of a protective system will be attended with grave danger to the whole policy of Free Trade. For when the thin end of the wedge has been inserted, and when one class of producers has been protected, it will be almost impossible to say why other classes should be left to shift for themselves. As we have already pointed out, the descent is easy; the first effect of Protection is to put large profits in the pockets of those whose capital is embarked in the protected trade; but the return to a free policy is an arduous and up-hill undertaking, since it cannot as a rule be made without entailing heavy losses on the manufacturers from whom Protection is removed. As regards the proposed appointment of a Royal Commission, we sincerely trust that the Government will adopt no such scheme. At the present time the manufacturer has undoubtedly to contend with a certain amount of commercial depression, and with an increasing pressure from foreign competition. The former may arise from the abnormal rate of production which prevailed immediataly after the Franco-German war, or from the vast amount of British capital which has been squandered in loans to bankrupt nations and upon bubble companies, or from the heavy losses entailed by constantly recurring strikes, or from a combina-

tion of all these causes; the latter probably springs from the growing enterprise and industrial skill of foreigners, and from the high rate of wages and short hours of work which prevail in our own, as compared with other countries. But certain it is that the Government can interfere in none of these matters for the purpose of stimulating industrial activity. There is but one mode in which governments can directly influence trade, and that is by imposing restrictive duties and granting bounties. And no Royal Commission is required to tell us whether influence of this kind is desirable or not. It would be as reasonable to appoint a Commission to inquire into the truth of the multiplication table as to call for an inquiry as to the advisability of checking the importation of foreign goods because they happen to be cheaper than goods of our own production.

We can easily understand why manufacturers should be eager for the adoption of a system that would rapidly fill their pockets by closing the home markets to foreign producers. Self-interest is a motive which is sometimes not to be counterbalanced by any weight of logic. But how it comes to pass that men join in the agitation against Free Trade, without having any personal interest in the establishment of a protective system, is beyond our comprehension. At the Cannon Street meeting above referred to, a letter from Lord Bateman was read, expressing his lordship's sympathy with the agitation against our "one-sided Free Trade system," and stating that he intended to introduce the qnestion into the House of Lords. Sir John Heron Maxwell was himself present at the meeting, and moved that a copy of the resolutions there passed should be forwarded to the Prime Minister. In doing so he remarked, that although England has prospered for more than a quarter of a century under Free Trade she does not prosper under it now, and that there is evidently "something out of gear." To us it seems that, if anything is out of gear, it must be in the minds of those who bring sets of facts together as cause and effect, without being able even to suggest wherein the connection between them lies.

The tone of the memorial drawn up for presentation to the Prime Minister is unmistakeably hostile to Free Trade. Protection looms

forth from every line. Those who call for an inquiry tell us that they are not opposed to proper Free Trade, but only to the one-sided system in which we are now engaged. But to this the reply is that even a one-sided system of Free Trade is preferable to a double-sided system of Protection. The supporters of Protection (at least the more intelligent section of them) know full well that their cause cannot be upheld on logical grounds. At the Cannon Street meeting the solitary individual who attempted to raise his voice in opposition to the prevailing tone was quickly hooted down; and we noticed that immediately after the declaration of the German Government in favour of the Protectionist policy, Prince Bismarck was compelled to order the seizure and destruction of a number of the *Frankfurter Zeitung*, in which that policy was attacked. But we imagine that in this country Protectionists will have some heavy work to perform before they will succeed in converting the public to their views. However, it will be well to be on the alert. The enemy are actuated by motives of keen self-interest, and aided by those who seem to imagine that an obstinate resistance to generally accepted principles must necessarily be a mark of superior wisdom, it is by no means impossible that they may eventually succeed in gaining some amount of practical support for their cause.

UNSINKABLE RIVER STEAMERS.

EVER since iron has been in use as a material for ship-building, naval architects have been alive to the fact that although iron ships, as compared with wooden ones, are exceptionally liable to serious local damage, there is on the other hand a possibility of so constructing them, that such local damage shall not imperil the vessel. Much misapprehension has however obtained as to the arrangement, desirability, and uses of water-tight bulkheads in iron vessels. This was forcibly exemplified by the absurd legislation in respect of them, which formed a part of the Merchant Shipping Act of 1854, and

which was wisely repealed in 1862. The 300th section of that Act prescribed that every steamer should be divided as nearly as possible into three parts by watertight bulkheads. Of course such a division was practically of no use whatever, as if one of the end compartments were pierced, the trim of the ship would be so much altered that, even if the water did not get to her hatchways, she could not live long in a sea-way. As if still further to increase the absurdity of the whole thing, it was settled that the bulkheads need not extend to the upper deck in a vessel of more than two decks. In nine out of ten cases of three-decked vessels, if one-third of the ship's displacement were lost, the water would certainly be higher than the top of the bulkheads and would then run into the other compartments and sink the vessel. Since that time the collision bulkhead, as it has been called, has been insisted on by the Registries, and has commended itself to shipowners generally, and many ships and their crews have been saved simply through having this provision in case of the vessel being pierced forward. A common fault is to place the collision bulkhead too far forward, but we believe that this is done less frequently now than it was a few years ago. In screw-steamers also, the idea of the water-tight compartment at the after-end has met with almost general approval, as affording a security in the frequent cases of injury to the propeller shaft which may be the cause of leakage.

A third application of the same principle is in the case of the double bottom, which has the additional advantage of affording the means for the use of water ballast. The water ballast tank has, in the past, mostly been confined to that part of the vessel forming the cargo hold, but now frequently extends the whole length of the ship.

The Admiralty have constructed not only ironclads, but all war-vessels in compartments, and in many cases the partitions are very numerous and the partitioned spaces very small. Most vessels of recent build have athwartship bulkheads, water-tight flats, and also fore-and-aft bulkheads. War vessels are of course designed to encounter special risks and this extreme sub-division is specially useful to them.

There is, however, another class of vessels which have to

encounter special risks, and in which we think the water-tight compartment principle might be much more usefully and easily applied than in sea-going merchant steamers. We refer to passenger steamers employed in the navigation of rivers and other smooth waters. These vessels are mostly built and fitted with a view to the conveyance of large numbers of deck passengers, the number being so large as to cause it to be altogether out of the question to attempt to provide for emergencies by life-saving apparatus. In many cases, it is true, the apparatus might be carried, but it would be useless in face of the fact that the crew of the steamer is so very small, sometimes almost infinitesimal compared with the passengers, and that the passengers, in vessels of this class, are usually especially helpless. Further, in many vessels which depend for a large part of their earnings on the conveyance of cargo, it has often been urged that water-tight partitions are a source of much inconvenience, and rather than put up with them the owners would give up the passenger trade. We think that perhaps the inconvenience has much been exaggerated, but it does certainly exist, and in reference to this we may mention a fact bearing upon the case which has recently come under our notice. The Admiralty have been enquiring into the capabilities of our large merchant steamers for being converted into useful cruisers in the event of war with a maritime power. Three hundred was the estimated number of vessels which, from their size and speed, were likely to be useful; and detailed inspection has shown that about one hundred of them fulfil the bulkhead condition, that is, are so far divided, that when in fighting trim, which, of course, is much less than their usual load draught, a shot hole in any one compartment would not be the cause of such extra immersion as to be a source of serious danger. The special point to which we refer, however, is, that many vessels otherwise suitable have failed, because of their owners objecting to having a bulkhead which cuts off the engine-room from the boiler space. In the case of river passenger steamers the bulkheading of the hold need not be objected to from possible inconvenience as regards either the stowage of cargo or easy communication between engines and boilers. These latter vessels do not usually

lay themselves out for cargo, and what they do carry is in the form of miscellaneous goods which could as well, and as conveniently, go into small compartments, as into an undivided hold.

One serious drawback to compartments in seagoing vessels is the necessity for water-tight doors. There must for instance be such a door between the engine and boiler compartments, since to have them completely parted by a bulkhead extending to the upper deck would be an intolerable nuisance, and even in supposable cases, a source of danger. When there are doors, the question is will they act when wanted. Some of the vessels in the Royal Navy have been able to make good use of their water-tight sub-divisions, but in other cases the arrangement has altogether failed of its purpose. Our readers will remember the case of the *Agincourt*, which was run upon the Pearl Rock and got off again safely. The *Bellerophon* also sustained damage in collision which would have been fatal to a vessel of ordinary construction. On the other hand the *Vanguard* and the German ironclad *Grosser Kurfürst*, which was sunk by her consort in the English Channel, are instances of failure. There is first the liability of water-tight doors getting out of order so as not to act when wanted, and, secondly, the danger that they sometimes cannot be shut promptly after a collision has taken place. If, however, water-tight bulkheads were a part of the construction of smooth-water vessels, there would be no great need for doors at all, and it would certainly be safest to dispense with them. To go on deck to pass from one compartment to another in a steamer which was never in a rough sea would be always practicable, and in shallow vessels it could hardly be considered a very serious inconvenience.

It must further be remembered that in smooth-water steamers a much smaller number of sub-divisions would be sufficient than in the case of sea-going ships, and this for two reasons, viz.: that it is necessary for an ocean steamer to have a certain minimum freeboard, and that for her to be only sub-divided to such an extent as to be merely unsinkable, would be of little service to her, except she were very near a port. On the other hand, all that is necessary for a smooth-water steamer is that she should be insured against sinking: the smallest margin of buoyancy would give ample time in

most cases to rescue all her passengers if not to save the vessel herself. Secondly, it is well known that most river steamers, and more especially those which carry very large numbers of passengers, have a considerable margin of buoyancy, amounting in many instances to more than their total load displacement. For these reasons we should suppose that five bulkheads would usually be sufficient to ensure safety, even in the case of most extreme risk, that is, when the vessel is struck so near a bulkhead as to fill two adjoining compartments. This would necessitate a division between the engine and boiler rooms, and that the usual partitions at the ends of those spaces should be made securely water-tight. This only leaves a further necessity for the division of the fore and after portions of the vessel, each into two parts, certainly an inconvenience, perhaps a serious inconvenience, but nothing when compared with the resulting gain.

Before leaving this subject we must make some reference to the question of strength. It would of course be useless to construct a vessel unsinkable when two of her compartments are filled, and yet otherwise so weak that in such an emergency she would tear in two. In the event of any two adjoining compartments being pierced, a considerable longitudinal strain would be brought upon that part of the structure of the ship bounding and adjacent to the compartment into which the water was admitted. In most vessels floating even in still water, the different parts of the hull are subjected to strains caused by the unequal distribution of weight and buoyancy. In a sailing ship having no cargo on board there is obviously an excess of buoyancy in the midship body, and the weight of the extreme ends is partly supported by the buoyancy amidships, thus bringing a strain upon the vessel, the tendency of which is to cause her to lose her sheer or to become *hogged.* In vessels with fine ends, the same thing is the case even when they are loaded. In screw steamers also, although the weight of the engines and boilers is in the buoyant part of the vessel, usually when she is loaded the weight of the ends hangs to some extent upon the buoyancy of the midship body, and hogging strains are brought upon the whole structure. In paddle steamers, however, the weights of the engines and boilers being usually more con-

centrated, the vessel often is exactly amidships strained in the opposite direction to *hogging*, and in the parts of her midship body before and abaft the engines and boilers the case is reversed, and there is there a *hogging* strain.

The extreme case of straining after a collision would be when the vessel was so struck that water was admitted to both engine and boiler rooms. Under these circumstances the weight of the engines and boilers, and of the structure of the ship near them, would be borne by the increased immersion of the ends, and it is obvious that very severe strains would be brought upon the midship body of the ship, the tendency of the strain being to alter the shape of the vessel, so that the buoyant ends should rise and the middle sink. It must further be considered that in such a collision a considerable rent may have been made in the side plating, and the structure thus weakened at the same time that heavier demands are made upon it. These strains may, of course, be made matter of pretty exact calculation for each individual case. We think that in most instances it would be found that the required margin of strength might be obtained without any large increase of the weight of material in the structure desirable for other reasons. Considerable strength might in most vessels be gained merely by making the engine and boiler bearers continuous through the compartments next before and abaft them.

We put forward these considerations in favour of water-tight bulkheads in river steamers, believing that the advantages of them are so great for this special class of vessels, and the attending drawbacks so trifling, that they will at no distant period be generally adopted. With ocean steamers the case for them is, as we have remarked, not quite so clear. In the largest vessels, however, especially those in the Atlantic trade, the disadvantages of increased subdivision of the hold are not very serious and the greater difficulty of providing efficient ventilation will hardly at the present day count for much. In these vessels, however, if water-tight compartments become the rule, we confidently anticipate that those who plan them will make sure that they are not such shams as the Act of Parliament bulkheads alluded to above.

THE NATURE AND MOTIONS OF ATMOSPHERICAL DEPRESSIONS.—Part I.

IN accordance with the suggestions of M. Buys Ballot, I now propose to consider the characteristics of depressions, and it may be premised that there is no subject more hedged about with difficulties than the investigation of the propagation of motion in fluids. Just as physically they slip through your fingers when you attempt to grasp them, so mentally it is all but impossible to follow out and elucidate their movements. The most, therefore, I can hope to attain in this essay is to offer a few thoughts on this abstruse subject. Nor will I try to introduce anything by way of estimating the forces producing and regulating the motions of these depressions, as the present state of our knowledge wholly forbids such an attempt. On the contrary, it will be my endeavour to limit the enquiry to considerations of practical value, neglecting others, however interesting, from a philosophical point of view. Before, however, offering the few practical remarks which I intend to make regarding the weather conditions, with which we are most familiar, I think it useful to extend the theoretical view a little further.

One of the effects of the depression formed by the sun is an oscillating or wavy motion of the air, and as this is the least important, at any rate in its daily results, we will only glance at a few of its salient features.

Waves differ in their mode of transmission according to the conditions under which they are produced; for instance, in the pipes of an organ the waves are propagated by condensations and rarefactions, that is to say, the particles move to and fro in the line of transmission. On the other hand in water the particles rise and fall, the former being called longitudinal and the latter transverse vibrations. They belong to either class according to the manner in which the force acted which originated them. The waves propagated in water are usually of a circular or partially spherical character, and those in the atmosphere will no doubt be similar with the features of condensation and rarefaction superadded as air differs from water in being an elastic fluid.

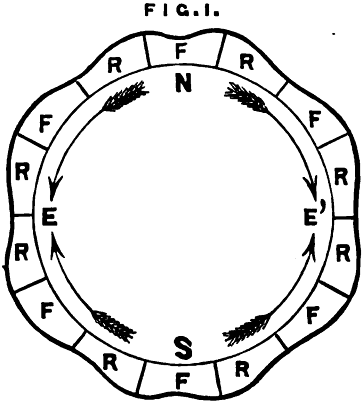
If we could suppose the atmosphere to have a covering prevent-

ing their rise, these waves would progress by longitudinal vibrations, and the particles of air would move to and from the centres of condensation and rarefaction; but as the air is free to rise, they will also possess the character of transverse vibrations. It needs no illustration to show that such waves will assume a circular form, for when the wave is rising the particles will be moving towards the centre from every side, and also rising, thus producing a circular wave. Again, when the wave is falling the particles will be moving away from the centre in every direction, and also falling, and therefore forming a circular hollow or depression. The greatest rise or fall takes place at the centre, and the greatest lateral movement near the skirts of the wave.

In Fig. 4 of the last article * we saw that the sun's depression was followed by a compression, and that again by a secondary depression and compression, and that these move round the equatorial regions following the sun.

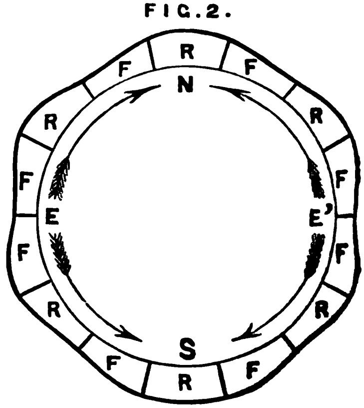
It is easy to see that these oscillations will produce corresponding oscillations north and south, and observation shows the existence of two areas of low pressure—one in the north in the vicinity of the arctic circle, and the other near the antarctic, and that at the poles calms prevail, pointing to the existence of circular waves or depressions there.

FIG. 1.



From 4m. to 10m.
or „ 4a. „ 10a.

FIG. 2.



From 10m. to 4a.
or „ 10a. „ 4m.

* *Nautical Magazine*, January, 1879, page 17.

Figures 1 and 2 give a representation of these oscillating movements. Figure 1 shows a compression forming at the equator. The arrows indicate the direction in which the waves are moving. E, E' are points on the equator, and N. S. north and south poles. The circle represents a section of the earth in the plane of a meridian. The letters R. and F. indicate that the barometer is either rising or falling in the respective sections of the atmosphere. The surrounding wavy line shows the waves and depressions.

It is evident that these oscillations have a progressive movement, and so far do not resemble exact vibrations, which rise and fall in the same place. The air moves towards the equator, to fill up, as it were, the depression formed by the sun; for the action of the sun is very much the same as if a certain quantity of the air was very gradually lifted out of the atmosphere during the formation of the depression, and just as gradually restored during the following compression. It may also be noticed that the air moving away from the poles on both sides will cause a depression there, so that whilst the barometer is rising at the equator it will be falling at the poles. Figure 2 shows a depression forming at the equator, and at the same time a compression at the poles. The boundaries, extent, and number of these depressions and compressions can only be determined by observation. I am not aware that we are yet in possession of the necessary information to do so.

The waves coming from the north will probably pass on and give rise to weaker oscillations in the south, and *vice versâ*. At any place, therefore, there will always be both a rising and falling motion, either predominating according to its origin. The figures show the principal oscillations. That this serves a useful purpose will be seen as we proceed.

If this depression remained stationary, and the cause which produced it ceased to operate, a circular wave would take its place, and the waves north and south would become depressions, and the depressions, waves, and these oscillations, would continue for some time, and gradually subside.

It must be observed here, that the depression, or hollow, is as

truly entitled to the term wave as the summit, although commonly the definition is confined to the latter, and it may be as well to accept the popular distinction.

To resume—if the cause which produced these oscillations were of an intermittent character—now acting and again ceasing to act, it is plain that these oscillations would succeed each other in close relation to the times of the intermittent action, and the oscillations would gradually increase according to the persistency of the force.

But, as the primary depression has a progressive movement westwards, the series of subsidiary depressions and waves will also move in that direction. If the sun were always vertical at the equator, the oscillations produced by one depression would not have time to subside before another would be formed, and this would go on increasing until the results would be of the most disastrous character, to which the most terrific hurricane which ever blew would be as child's play. But in the constantly varying declination of the sun we have a protection against the occurrence of such a calamity, and a beautiful instance of design, and of the wisdom and beneficence of the great Creator.

The sun, however, is sufficiently persistent in its action to maintain a constant deficiency of pressure in the equatorial regions. The actual effect of its action on any one day being only equivalent to a diminution of pressure represented by a barometrical fall of about the one-tenth of an inch, it might naturally be objected that this in itself would be inadequate to produce the circulation. But it is the continuance of this small action that brings about the result. We know that the very trifling force which a child can put forth is sufficient in its cumulative effects through the medium of a machine to accomplish what the strongest man unaided would utterly fail to do.

Leaving the oscillating movements, we must now try and understand what may be called their permanent effects. The first effect, as has already been stated, is to produce a permanent deficiency of pressure in the equatorial regions, and this again will cause a constant deficiency of pressure somewhere to the north and south, with a constant redundancy of pressure between these areas of low

pressure, and at the poles. The prevailing winds of the globe, we have already seen, bear out this supposition.

These persistent effects are graphically represented in Figures 3 and 4. Figure 3 showing the condition generally existing due to the sun, from June to December, and Figure 4 from December to June.

FIG. 3.

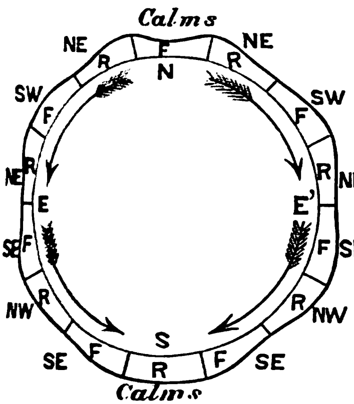
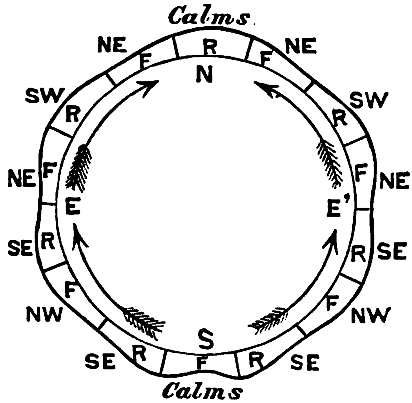


FIG. 4.



Sun.	From June to December.	From December to June.
Moon.	Going south.	Coming north.

The calm belts are situated in the vicinity of the lines separating the various sections. The arrows show the direction in which the waves are moving. N.E. shows gradient for north-east wind; S.W. gradient for south-west wind, and so on. In Figure 3, whilst the sun is going south, we observe that a rarefaction takes place at the north pole, and a condensation at the south. In Figure 4, whilst the sun is coming north, the reverse takes place.

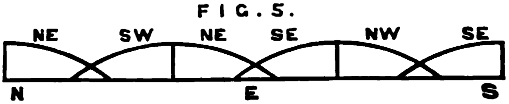
The rising gradients will no doubt have the strongest winds—thus, from June to December these will be north-east in the northern, and N.W. in the southern hemisphere, and from December to June, S.E. in the southern and S.W. in the northern. The general motion of the air is during the former period from the north and during the latter from the south, obviously producing opposite results in the different hemispheres—bringing summer to the one and winter to the other.

All these gradients have a progressive movement following the varying declination of the sun, and also a rotatory movement due to the motion of the primary depression westwards. The greater the variation in declination the greater will be the movement from the north or south to restore the equilibrium. On the other hand the less the sun's declination varies the greater the rotatory velocity will become. The progressive movement of the gradient combined with the motion of the depression would obviously produce a motion of rotation for a free body acted upon by two forces not exactly opposite, naturally tends to rotate.

Lieutenant Maury, in his work on the "Physical Geography of the Sea," paragraph 604, says, "It (the equatorial cloud ring) is broader than the belt of calms out of which it rises . . . . at least we may infer such to be the case, for the rains are found to extend out into the trade winds, and often to a considerable distance both to the north and the south of the calm belt."

It is clear that, owing to the daily oscillation of these gradients, they will, to a certain extent, overlap each other, and probably would be more correctly shown as in Figure 5.

FIG. 5.



It is also evident that the waves will not only meet and overlap each other, but will also pass through each other, and give rise to weaker oscillations, north and south. The waves will therefore be double crested, and in each case there will be a rising and falling motion of the gradient, and that this is an essential feature in the circulation will be apparent further on.

The rate of variation of the sun's declination alters according to its position in the ecliptic, being greatest about March and September, and least at midsummer and midwinter; these latter periods being consequently called the solstices. The year is thus divided into four great periods, two of greatest rotatory velocity, when the sun's declination varies least, and two of greatest progressive movement, when it varies most. About midsummer we are near the top of the south-westerly gradient, and it is plain that

the rotatory velocity will be east there. As the sun goes south, this gradient gradually passes over us, till about the end of October the first traces of the north-easterly gradient begin to be felt. During a portion of November, we are in the area of conflicting currents, with their accompanying calms and fogs, and emerging from that neighbourhood we find ourselves in the polar current. After the 22nd of December, the sun being now on its northward journey, these changes occur in the opposite order, until about the end of February we are once more in the great westerly current.

In the same way, the lunar month, of 27⅓ days, may be divided into four periods, two of greatest easting or westing, according to the gradient which is passing over us, one of greatest northing and one of greatest southing.

As the inclination of the moon's orbit to the ecliptic is a little over 5°, and its nodes complete their revolution in 18⅔ years nearly, we have another period which also may be divided into four similar parts. We are this year in the greatest northing, and that may account for the severity of the winter. Eighteen years ago the moon was nearly in the same position, and who does not remember the exceptional severity of the winter of 1859-60? The maximum declination of the moon will gradually diminish during the next five or six years, when it will reach its minimum oscillation north and south of the equator. The maximum oscillation took place in 1876. We may therefore expect the westing or easting in our winds gradually to increase during the next few years, and the northing and southing to diminish. Of late years we have been in the greatest northing and southing, and that, I think, accounts for the comparative absence ef easting or westing in our winds.

The times in the table are deduced from observation of the time of change in relation to the times of the moon's meridian passage. The time varies according to the declination of the moon, varying from the time of meridian passage to four or five hours after when the moon is going south, and from four to six hours after when it is coming north—the former being motion towards a depression and the latter from a compression. That

the motion should take place earlier when the moon is on its southward journey than when on its northward will readily appear, when we consider that in the former case the general motion of the air is from the north, and in the latter from the south; and also from the fact that the depression comes first and then the compression, so that the motion from the compression is later than that towards the depression.

There is a subject which I have not yet touched upon, viz., the compressions formed by the sun and moon on the opposite side of the earth. Careful local observation has induced me to disregard that formed by the sun, whilst the effects of the moon's compression is embodied in the table in the form of the weaker currents. A little consideration will make it clear, that while the moon's depression is going south its compression on the opposite side of the globe is proceeding north, and *vice versâ*, so that when the moon's depression has reached its maximum southern declination the opposite compression has reached its maximum northern declination.

I think I have now stated the principles involved in the construction of the table of currents, and I am conscious that many of the subjects merit a broader treatment, but this inquiry has extended so far beyond the limit I at first anticipated, and indeed appears to have an ever widening character as I proceed, that I have been induced to narrow the area of investigation as far as I possibly could consistently with giving a clear view of the theory which I thus put forward.

I might quote largely from Lieutenant Maury's "Physical Geography of the Sea" in support of these positions—indeed, I am greatly indebted to that work and also to Mr. R. H. Scott's "Weather Charts and Storm Warnings" for the facts set forth in the preceding pages, but I thought these so well known as not to require lengthened quotation. In the former work, paragraph 1,020, Lieutenant Maury remarks, "In the equatorial calm belts the mean barometric pressure is about 0·2 inch less than it is in the trade winds, and this diminution of pressure is enough to create a perpetual influx of the air from either side and to produce the trade winds. Off Cape Horn the mean barometric pressure is 0·75 inch

less than in the trade wind regions. This is for the parallel say of 57°-8° south." In the latter work, page 74, Mr. R. H. Scott says: "Investigations into the distribution of pressure over the earth's surface have shown that there is an almost constant deficiency of pressure in the neighbourhood of Iceland."

There are many questions connected with the general circulation which I have not referred to, such as the monsoons, the land and sea breezes, &c., but there is one which I can hardly pass over without remark. Lieutenant Maury in the work already quoted, paragraph 1,009, tells us that "we may consider the following as established facts in meteorology: that the south-east trade winds are stronger than the north-east; that the north-west passage winds—the counter trades of the south—are stronger and less liable to interruption in their circuits than the south-west, the counter-trades of the north; that the atmospherical circulation is more regular and brisk in the southern than it is in the northern hemisphere."

This is generally thought to be due to the "unequal distribution of land and water in the two hemispheres;" and this supposition is supported by so many undeniable facts, that it may be received as correct. It may be asked, How do you account for this by the depression theory? Does it make any difference whether the depression crosses land or water?

When the depression during its westward journey is travelling over the ocean, the atmosphere north and south presses on the waters of the ocean with greater force than in the vicinity of the depression. The waters north and south will therefore sink, and those under the depression will rise. But as the depression approaches the coast this action ceases, and its full force is felt. The effect of the depression, in producing the atmospheric circulation, will thus be much less while crossing the ocean than when traversing the land, for on the water a part of the force exerted by the atmosphere north and south to restore the equilibrium is expended on the ocean.

In all probability the typhoons of the China seas, the Mauritius and West India hurricanes, the monsoons, the land and sea breezes, the absence of rotatory storms in the South Pacific and South

Atlantic, in short, all the irregularities in the general circulation may be traced to this cause.

In closing the theoretical view, which has been mainly based upon the mean observations, it must not be forgotten that the moon will form every 27⅓ days gradients similar to those exhibited in Figures 3 and 4.

D. D.

THE TERMS "PORT" AND "STARBOARD."

THE commander of a mail steamer has lately put forth a pamphlet,* in which he advocates the abolition of the terms "port" and "starboard" as applied to the steering of ships, and the substitution of the terms "right" and "left." The grounds on which he bases his reasons for the alteration, are that the terms "port" and "starboard," as at present applied, are contradictory and anomalous, thereby tending to confuse both the giver of the order and the person to whom it is given, and that owing to this the helm is often put the wrong way, the result being a collision or accident of some kind. It is natural to suppose that, before advocating such a sweeping innovation, it would be requisite to closely scrutinise the records of collisions, so as to find proof that a large percentage occurred or were brought about through a mistake either in giving or construing the order to "port" or starboard," as the case may be. Whether this has been done or not, the pamphlet affords no proof, the writer contenting himself with a reference to the blunder which caused the sinking of the *Grosser Kürfürst*, and an assertion that it is "the opinion of many, that a large proportion of the collisions that occur are due to the helm being put the wrong way to that intended by the giver of the order." If this were so, surely the evidence given, in cases of collision, before the Courts of Inquiry,

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"Collisions afloat: Causes which lead to them. The terms 'Port' and 'Starboard.' What they mean. Ought they to be retained." Liverpool: Philip, Son, and Nephew. 1878.

would betray it, but, as this never happens, it is safe to argue that the percentage of collisions which do occur in that way must be infinitesimally small, so that the question naturally arises, "On what is the foregoing opinion founded?" Surely not on an isolated blunder, such as occurred in the case of the *Grosser Kürfürst*. In that case it is admitted that of the six men at the wheel, three understood the order to port the helm, while the other three understood precisely the contrary. But we must not assume that the three who were in the wrong heard the order rightly and misconstrued it technically; rather let it be said that they heard the order imperfectly, and supposing it to be the opposite to that really given, acted accordingly. Such a blunder was as likely to occur with any other terms in use, the mistake not being technical, but one of imperfect hearing or inattention, which can be accounted for by the motive-power of the helm being under the control, not of one man, but of a number of men, who naturally depend one upon the other for hearing the order given, consequently there is a lack of individual attention, and the old saying is verified, "What is everybody's business is nobody's business." If the indictment against the terms "port" and "starboard," as at present applied, rests on no stronger proof than is afforded in cases of this kind, it must fall to the ground. In describing the causes of this alleged frequent mistake, the pamphlet says, "that often the giver of the order *inadvertently* gives the wrong word, of which he is of course unaware."

Now when the word *inadvertence* is used, it leads directly to the root of the error, and the writer need not have gone farther, and laboured unsuccessfully to prove that inadvertence is the natural consequence of the terms "port" and "starboard" being anomalous, contradictory, and nonsensical. *Inadvertence* is produced by carelessness, nervousness, or want of presence of mind, in other words is nothing but gross negligence, and cannot be converted into strict attention by any change of terms. The man who would say "port" when he meant "starboard," is just as likely to say "right" when he means "left." And here it would be only right to contend, that the terms "port" and "starboard," as at present used, are as the seaman understands them (we have nothing

to do with the landsman), neither contradictory, anomalous, nor nonsensical. The landsman element must be eliminated altogether from this question, for, if we once admit it, a great revolution must inevitably take place in nearly all our technical terms aboard ship.

The order to "port" when you want the ship's head to go to "starboard" may appear inconceivable to a landsman, who naturally thinks that the order is given in direct relation to the ship's head, but the order does *not* signify "let the ship's head go to port," the words "your helm" being understood, the order literally being, as is often fully given, "port your helm." And here it must be remembered that there is no direct lateral motion conveyed to the ship's head by the action of the rudder; it is the stern that receives the initial motion, and the ship's head, being at the other end of the keel, and acting as a pivot on which the keel turns, simply describes the corresponding angle in the opposite direction. Therefore, when the helm is "ported," the ship's stern goes to "port," and consequently the head describing the corresponding angle goes to starboard, and *vice versâ*. Every seaman knows this, who has stood at the helm of a vessel, and conned the wake astern to check him in his steering. Every master and officer must know this, who has taken his vessel in and out of harbours, and has watched the stern to see if it would clear a pier, a dolphin, or another vessel, before putting the helm over one way or the other. Is there contradiction, anomaly, or nonsense in this?

The origin of these terms for steering is ably explained in the pamphlet, but the conclusion arrived at is for all practical purposes totally at fault. The writer labours to prove that with seamen, education and instinct are in antagonism, and that when one is at fault, the other gains the upper hand. What he really means is, that all seamen, no matter what their intelligence or experience, always retain enough of the landsman about them as to lead them at times in cases of emergency to throw over all their previous training, and mistake generalities for technicalities. This can never be. The intuitive impulse in a man's mind to say that which he means cannot possibly lead him to say that which he does *not* mean. If he say "port," he means "port," that is, in the sense in which seamen mean it, "port the helm," not

"let the ship's head go to port." Both education and instinct teach him, and I cannot think of anything more firmly riveted in the mind of a seaman, that when he "ports the helm," the ship's head and rudder both go to "starboard." It is generally understood in discussing the fallibility of human nature, and in fact of all animal nature, thaf if any outside circumstance should lead the mind astray, instinct steps in and supplies the correction to the benefit of all concerned: but here we have the writer of the pamphlet asserting that education supplies the correction, and it is only when instinct rushes in that there is a disaster. Surely there must be something wrong in this, otherwise the word instinct is misused. With seamen, education and instinct are one and the same, and the man who "ports" to the order of "starboard," or *vice versâ*, is belying both instinct and education, having lost his presence of mind, which means that for a time the true influences or workings of his mind are *not* present; and as instinct is allied to reason, we may safely call it a true working or action of the mind. It is not safe, therefore, to assume that in every mind in which this liability to lose its balance exists, it will crop up at every emergency, no matter what terms are in use. The writer gives a strong proof in favour of the above assertion when he says in the pamphlet, "that he himself has often made the mistake of saying 'port' or 'starboard' when he meant the contrary, and the probability of so doing increases in the ratio of the suddenness of the emergency." Now when "the suddenness of the emergency" is so introduced as an element contributing to the fatal mistake, the logical conclusion is that the real cause is loss of presence of mind irrespective of what terms may be in use, for how often in accidents on shore do we find that a person, losing his presence of mind in a sudden crisis of danger, rushes forward instead of backward, to the right instead of to the left, or *vice versâ*, although perhaps a friendly warning voice has given him the right word in tones of thunder. Therefore, even though the terms "port" and "starboard" were contradictory and anomalous to the seaman, it is not just to impute the disaster to the use of them, when it can be distinctly traced to loss of presence of mind. That we should retain the original applications of the steering orders, as derived

from the motion of the tiller with which all ships were originally steered, is a manifest necessity, when we consider that all the terms used on board sailing ships are derived from the same source, and would have to be included in the alteration.

For instance, "hard up" signifies "hard up to windward," yet when the order is executed, both the rudder and the ship's head go to leeward; for, originally, when the tiller was on the fore-end of the rudder, it actually did go "hard up to windward." So also, "hard down" signifies "hard down to leeward," yet both the rudder and ship's head go to windward, the tiller describing the corresponding angle in the opposite direction, and being literally "hard down to leeward." This is, to the landsman, a seeming contradiction and anomaly, if he consider not the real signification of the terms, and that every seaman is brought up to understand them accordingly. It might as well be expected that in tacking ship, in obedience to the order "hard-a-lee," a man would put the wheel, the rudder, and, consequently, the ship's head, to *leeward*, as that in obedience to the order "hard-a-port," he would put the wheel, the rudder, and, consequently, the ship's head, to port, which would really be "hard-a-starboard." It is further stated in the pamphlet, that "the French have recognised the risk of the anomaly, and have met it in most of their ships by reversing their wheels, so that they are turned in the direction of the given order;" that is to say, when the word "port" is given, the wheel is turned to "port," the rudder and ship turning to starboard. It will be found on enquiry that this has been done in French sailing ships, *not* to recognise the so-called anomaly, but for a distinct reason altogether. All sailing vessels, when running free with a quarterly, or beam wind, and also when on a wind, have a strong tendency to come to windward, which it takes all the efforts of the helmsman to overcome, especially with the wheel geared, as it generally is; for, to put the ship's head off to leeward, the wheel must be hove *away from* the helmsman, and a man cannot exert half the force in heaving the wheel away from him as he can in heaving it *towards* him, as any man knows who has ever steered a sailing vessel. This it is the French have recognised, and this only, as they roundly assert, if questioned on the subject.

But as the pamphlet maintains that it is for steamers that fresh rules are necessary, it is among the officers and seamen who serve in steamers that we must look for a "clear, intelligible explanation of the terms 'port' and 'starboard,' as at present applied to steering." And what say the majority of them? It will be found on questioning them, that if on the approach of another ship the order "port" be given, it conveys to them the idea that they must present the port side (if at night, the port light) to the danger, and pass it on the "port" side; so also if the order "starboard" be given, that they must present the "starboard" side to the danger, and pass it on the "starboard" side. This, although not the original and true meaning of the term, which is applied really to the helm, is yet the true result, and as such has grown, as it were, into the imagination of the steamboat seaman, so that the moment an order is given, the proper and most speedy connection between the order and the imagination is brought into play, and so the true result is attained.

One very great objection to the terms "right" and "left," would be their want of vowel sounds for sonorous articulation, which is at sea, in all ships, a very essential point, more especially in stormy weather, when it is at all times difficult for the human voice to be heard. There is no volume in the words, which every one may prove for himself, by attempting to give prolonged utterance to them in a shout. It is plain that we cannot do away with verbal orders and substitute signals in every ship, so that the question must be looked at with regard to the practicability of sonorous utterance.

Again, the word "right" is already used in relation to the helm, implying that it is to be put amidships, and is also among the most frequently used words on board of a ship now-a-days. An officer calls out an order to a man, to which the response is "all *right.*" At night time, the look-out may report a vessel or a light, to which the officer on the bridge responds loudly, "all *right.*" The man at the wheel would hear the word "*right,*" and thinking it was intended for him, would act upon it. Thus we might have many a fatal mistake, which with the terms at present in use is impossible with proper attention, but quite possible with *inad-*

vertence, or loss of presence of mind in the face of a sudden emergency.

"Port" and "starboard," as steering terms, at present in use, have a perfectly *distinct* and *definite* meaning to all seamen, therefore they cannot be *contradictory*—they relate to the movement of the helm, and not to the indirect lateral motion conveyed to the ship's head, therefore they are not *anomalous*—they are in general use throughout the maritime world, in navigating seas and rivers, and the mistakes and disasters resulting from their use are inappreciable as a percentage of accidents, consequently they cannot be, and are not, *nonsensical*.

A. J. G. C.

BRIEF SUMMARY OF COMMERCIAL VOYAGES TO THE OBI AND YENISEI RIVERS, SIBERIA.

MR. C. R. MARKHAM, C.B., Secretary to the Royal Geographical Society, read a paper on "The Arctic Expeditions of 1878," before that Society on 9th December last; after a brief reference to the exploits of the earliest adventurers in that part of the Arctic sea which lies northward of Europe and Asia, and to the later voyages of Carlsen, Johannesen, and others in the same direction, for the purpose of opening up new fishing grounds for the Norwegian fishermen, he says, "it is, however, just to give Captain Wiggins, of Sunderland, the credit of having been the pioneer of a sea-route for trade between Europe and the Yenisei river which, in future years, will be important. His voyages in 1874, 1875, 1876, and 1878, from that point of view, have been very useful, and his suggestion that an accurate survey of the sea of Kara, and of the gulf of Obi, should be undertaken, is well worthy of support."

A large packet of papers—partly in manuscript, and partly printed matter—having been placed at our disposal by Captain Wiggins, we are enabled to put on record an accurate summary of the work done by himself and others, in ascertaining the season

for navigation, and the extent to which the rivers Obi and Yenisei are navigable, and in finally opening up Siberia to commerce. Captain Wiggins, of Sunderland, is a master in the mercantile marine, and, as one of themselves, our readers will appreciate him all the more, inasmuch as when he could get little or no help so long as the adventure was on trial, he nevertheless, without hesitation, spent his own money in establishing a new and practicable ocean-route for the development of commercial relations between Western Europe and Northern Asia.

No. 1.—1874: Captain Wiggins, in the Arctic steam yacht *Diana*, sailed from Dundee, June 3rd; cruised in the Kara sea for eight weeks, surveying the coasts of Yalmal, the Samoyede land, and Kara gulf; crossed the Kara sea, and proceeded some distance up the gulf of Obi, thence north and north-eastward towards the Yenisei; being the first steamer that ever plied in these waters; discovered all open water to the northward, and finding the navigation to the Obi and Yenisei of easy accomplishment; finally returned to the west coast of Novaya Zemlia, searching for the Austrian expedition, which had been absent three years.

No. 2.—1875: Captain Wiggins, in the cutter yacht *Whim*, of 20 tons register, sailed from Sunderland, June 28th; proceeded direct for the Kara sea, *viâ* Waigatch strait; constant heavy head gales prevented the tiny craft entering the Kara sea; after being driven back to the coast of Norway, bore up for home, arriving late in October, all well.

No. 3.—1875: Professor Nordenskiöld sailed from Norway in a walrus vessel, the *Proven*, fitted out by the wealthy merchant Mr. Oscar Dickson, of Gottenburg; succeeded in reaching the Kara sea before the severe gales set in; crossed the sea without seeing ice; reached the estuary of the Yenisei, and proceeded about 200 miles up the river in a sailing boat; the river steamer belonging to Mr. Ballandine (mayor of Yeniseisk) giving him passage the rest of the way, some 1,600 miles. A good port of discharge was found on the eastern side of the mouth of the Yenisei, and named Port Dickson.

No. 4.—1876: Captain Wiggins sailed from Sunderland in his

Arctic screw steam-yacht *Thames*, July 8th; cruised in the Kara sea for upwards of a month, examining its shores; proceeded to the mouth of the Obi, but heavy head gales and strong downward currents prevented any ascent of the river; proceeded thence to the Yenisei, and succeeded in ascending that river to the distance of nearly 1,000 miles; wintered at Kuriaka.

No. 5.—1876: Professor Nordenskiöld, again fitted out by Mr. Oscar Dickson, sailed from Norway in the screw steamer *Ymer*, of about 400 tons; reached, without difficulty, the Yenisei, but not being able to ascend, landed part of his cargo at the fishing station of Korepovskoie, and returned home in safety.

Note.—The result of these voyages proved that the great rivers Obi and Yenisei could always be reached by navigating the Kara sea, provided that a certain part of the summer were chosen for the trip. It had been suggested that the success of Nordenskiöld's voyage of 1875 was due to an unusual, and more favourable, state of the ice in that year than ordinarily obtained; his voyage of 1876 was undertaken to disprove this assertion: he reached the Kara sea on the last day of July, and found it greatly encumbered with ice, which, however, cleared away during August, and thus enabled him to proceed forthwith across the gulf of Obi to the entrance of the Yenisei: he found the Kara sea perfectly free from ice in September on his return voyage, and concluded that the Yenisei can always be reached during the latter half of August.

No. 6.—1876: Captain Schwanebach, fitted out by the Russian merchant, Mr. Sideroff, of St. Petersburg, proceeded down the Yenisei in a schooner of 300 tons, built by Mr. Boiling, an Englishman, at Yeniseisk; but being late in the season, and missing the *Thames* on her way up, wintered at the estuary in an exposed situation and was wrecked by the drift ice in the following spring.

No. 7.—1876: Captain Dahl, in a schooner, the *Moscow*, built at Tiumen on the Obi, sailed down the river to Nadym; not being able to manage the vessel at sea with the river sailors, was driven on the sandbanks, and after great difficulties bore up in a damaged state to Obdorsk, where she wintered, and was finally sold.

No. 8.—1876: A Bremen expedition, under the guidance of Messrs. Brehm and Finsch and Count Waldburg-Zeil, sailed down

the Obi in large sailing boats) being towed by steamer as far as Obdorsk), and proceeded up the Suchtschia river; crossed the isthmus of Yalmal to within sight of the Kara sea; then returned to Tobolsk; and home to Bremen by the overland route.

No. 9.—1876: A Russian expedition, under the leadership of a Russian professor of geology at Tomsk, and fitted out by public subscription, performed a somewhat similar voyage to that of the Bremen expedition, but not exactly in company with it, their object being to survey the river; they returned to Tomsk.

No. 10.—1876: An overland expedition of Swedish botanists and zoologists proceeded down the Yenisei in one of the trading steamers belonging to Mr. Ballandine, mayor of Yeniseisk, and reached the island of Briochovsk. Finding Professor Nordenskiöld had not succeeded in ascending the river (and with whom they intended returning by sea to Stockholm), they were obliged to return overland again.

No. 11.—1876: Mr. Charles Gardiner, in his splendid Arctic s.s. yacht, the *Gloworm*, sailed from Southampton; cruised on the east coast of Novaya Zemlia and in the Kara sea for several months; visited Barentz Haven on N.E. coast of Novaya Zemlia, recovering valuable relics of Barentz's celebrated Arctic expedition; sailed to the vicinity of White (Weisse) island, and then returned safely to England.

No. 12.—1877: Mr. Alexander Sibiriakoff, the wealthy gold mine owner, fitted out a steamer (purchased in London) named the *Fraser*, and despatched her to the Yenisei with a small cargo and some gold-washing machinery, under the command of Captain Dalman; she landed her cargo, and returned in safety to Bremen.

No. 13.—1877: A company of Moscow merchants, headed by Count Kamerouski, bought a small steamer, the *Louisa*, loaded her at Hull and despatched her to the Obi, under the command of Captain Dahl, with a crew of Norwegians and Finlanders. She reached Tobolsk in safety, having been conducted and assisted up the river by Mr. Korniloff, the same merchant who entered into trading with Captain Wiggins, and who loaded the *Warkworth* in 1878; he, with all his fishermen, lightened the *Louisa* by

placing her cargo into his large lighters, and with his river tugs got the *Louisa* up to Tobolsk.

No. 14.—1877: Captain Schwanebach, with the schooner *Ibis* that had been built for, and fitted out by Captain Wiggins, sailed from the Yenisei and arrived safely at Stockholm; thence to St. Petersburg, towed by a man-of-war. Captain Wiggins had the disappointment, or mortification, of his crew refusing to make the voyage home in this vessel, and they (*i.e.*, nine British seamen) were therefore despatched overland, at great expense, having refused to attempt that which four Russians accomplished.

No. 15.—1877: The schooner *Moscow*, having again been fitted out at Obdorsk by a Tartar merchant who purchased her from the Moscow Societies, sailed, with three Russian fishermen, for the Taz; this hardy and courageous little band, not even knowing how to handle a sailing vessel, succeded in safely reaching the entrance of the Taz river at the head of the gulf of Taz; shallows preventing them proceeding further they were compelled, late in the season, to return to Obdorsk; on the way back the vessel was driven on shore by gales of wind, where she now lies in an uninjured condition high and dry; she is a very strong little craft, of about 80 or 100 tons, but badly rigged.

No. 16.—1878: Captain Wiggins, in the *Warkworth* steamer of 600 tons, sailed from Liverpool with a full cargo of general goods direct for the Obi; loaded at Nadym and returned in two months to London; landed a cargo of some 300 tons of splendid wheat, linseed, flax, and hemp, &c.

No. 17.—1878: Captain Rasmusen, in the steamer *Neptune*, 300 tons, sailed from Hamburg for the Obi; loaded near Nadym and arrived safely back to Hamburg with a cargo of wheat.

Note.—The last two voyages require a few additional remarks. Mr. Cattley, an English merchant resident in St. Petersburg, having made arrangements with Captain Wiggins to charter a steamer for the Obi river, then proceeded overland to Siberia to secure means for the shipment of a cargo of wheat, hides, tallow, &c. Captain Wiggins engaged the screw steamer *Warkworth*, of 600 tons, which he loaded at Liverpool with a general cargo of olive oil, Sheffield goods, cable chains, crockery-ware, porcelain,

glass, &c., and left the Mersey on the 1st of August, 1878. The voyage might have been commenced about a fortnight earlier, but the risks of stoppage from floating ice would then have been much greater, and as Captain Wiggins wished to make an experimental run as directly as possible to his journey's end, he thought it best to delay leaving port until the above date. The destination of the *Warkworth* was Nadym, a small town at the mouth of the river of that name, and nearly at the head of the gulf of Obi. The voyage from the Mersey to the once dreaded sea of Kara was about as fine and as free from difficulty as can be imagined. The *Warkworth* easily passed through the channel separating Novaya Zemlia from the mainland, and no difficulties were encountered either from ice, or storms, or badly constructed charts until the Kara sea had been passed and the gulf of Obi entered. Here the trend of the land was found to differ widely from the delineation of the coast-line as laid down in the Russian charts, which are the only guides to the navigation of these regions. The maps in question would appear to have been drawn up from vague reports, and this loose system of compiling has been attended with results that might have been foreseen. On the east coast the charts were as much as a degree wrong in longitude, and nearly all the places laid down on them were as far out in latitude. Again, the charts showed the shape of the coast, nearly all the way up the gulf, to be almost straight, north and south; but in point of fact the channel was tortuous and, in places, not so wide as represented. As the *Warkworth* drew towards the head of the gulf difficulties from shallow water were encountered, but careful navigation was sufficient to hold the ship harmless from these dangers, and she kept on making a good passage. When within about 70 miles of Nadym, the port of discharge, Captain Wiggins found what must have been very agreeable evidence of the manner in which some foreign nations have learnt the lessons which he has had so much difficulty in teaching his own countrymen. A steamer of 300 tons, named the *Neptune*, had been chartered to take a cargo to Hamburg, and she was lying at anchor in the open roads, with a steam tug and two lighters in attendance. The latter were enormous craft, and with their cargoes of Siberian

produce, had been towed down the Obi by the tug. When Captain Wiggins lighted upon the little flotilla, the skipper of the *Neptune* was in a difficulty; the water in which his vessel lay at anchor was so shallow that it was impossible for him to take on board the cargo brought to him by the lighters, and on the other hand the crews of the lighters were fresh-water sailors, who declined to go out to sea, where deeper water could be found. The poor fellows had never been out of sight of land in their lives, and they declined the risk of going away to sea with a captain who did not know the navigation of the gulf, and in whose company they might have to weather the dangers of a veritable ocean storm. At this juncture Captain Wiggins volunteered to go out into the gulf with the steam-tug and the lighters, to pilot the little fleet through the shallows, and to advise generally in case of bad weather coming on. This offer was accepted; the *Neptune* and her attendants went some miles out to sea into 16ft. water, and in two days the cargo was successfully put on board. A severe northerly gale was experienced during the time that the Hamburg steamer was loading, and the whole of the river men were dreadfully sick; but their craft rode out the gale well, and nothing worse happened to them. Finally, the *Neptune*, fully freighted, was sent upon her voyage, and Captain Wiggins returned to the *Warkworth*, whilst the river flotilla made for Nadym. It may be mentioned that the steam-tug and the lighters had come down the Obi from a distance of about 2,000 miles, and that the cargo, which they successfully sent to Europe by the *Neptune*, was a splendid one of wheat—quite equal to the best Californian or Australian samples. Captain Wiggins resolved to discharge his cargo, and take on board his return freight, off a fishing village called Linsita, a few miles from Nadym, in the estuary of the Obi; and when he arrived here, on the 23rd of August, the little fleet which was to descend the Obi to meet him was not to be seen. It did not arrive until five days afterwards. But on the 28th of August the work of transferring the cargoes was at once commenced. The freight-vessels consisted of two enormous lighters of 600 tons each, and drawing no more than five feet of water, and their consort was a little steam-tug, belonging to the merchant

Korniloff, of Tobolsk, who was present with a view of personally satisfying himself as to the means by which the new commerce might be carried on. Night and day all was bustle in and around the *Warkworth*, the work of trans-shipping the cargoes going on without intermission. The manufactured goods brought from Liverpool were hoisted into the lighters, whilst from the latter corn, linseed, flax, hemp, isinglass, and sample parcels of many other Siberian products were rapidly loaded into the *Warkworth*. The work was performed by some fifty or sixty labourers brought down the Obi by the lighters. Five days only were occupied in the transfer of the cargoes from bottom to bottom, and on the 3rd of September the *Warkworth* was fully loaded and ready for sea. One day's work of the above period was lost through bad weather, but altogether the interruption to business from this cause was not nearly so great as had been anticipated. Captain Wiggins states that the shores of the gulf in the neighbourhood of Linsita are clothed with forests of trees, consisting of larch, pine, birch, and the common fir. There was abundance of game everywhere, and amongst the birds he recognised were ptarmigan and eider ducks. On the 4th September the consorts parted company, the tug going off southward with the lighters in tow to reach the Obi, whilst Captain Wiggins commenced his arduous task of piloting the *Warkworth* through the treacherous shallows of the gulf. After a slow navigation of about 30 miles, Captain Wiggins encountered the series of shallows that had troubled him on his outward voyage. These sand-banks were now more dangerous than when the *Warkworth* had passed over them a fortnight previously. The water actually seemed to have fallen some five or six feet on them, the soundings being that much less than those taken when the vessel was passing southwards, and the difficulty of picking a way through the deepest parts was very great. After battling with these obstacles for several days, the steamer grounded hard and fast upon the sand, and much against his will Captain Wiggins was compelled to throw overboard about one-third of his splendid cargo of wheat. This was a most unfortunate circumstance, discounting seriously as it did the profits of the voyage. No risk of

the kind would have been run if the *Warkworth* could have been loaded outside the shallows, as had been the case with the *Neptune;* but the steam-tug that brought Captain Wiggins's cargo boats down the Obi was not a very strong or powerful craft, and the master declined to go out to sea with it under any circumstances whatever. However, sufficient wheat, and no more, was parted with to lighten the *Warkworth* over the sandbanks, and afterwards she made excellent way down the gulf, clearing it and entering the sea of Kara on the 10th of September. Here further troubles awaited them. Fog banks are often met with on the icy waters of this lonely sea, and Captain Wiggins had quite his full share of thick weather when once he was fairly afloat upon it. One day when hove-to in a fog near Pet straits, the *Warkworth* struck upon a sunken rock, and damaged her stern-post and rudder. Matters might have been very much worse, but temporary repairs enabled the captain to get safely to Vardö, in Norway, and after calling at this little port the *Warkworth* steamed direct for London. Not a single incident diversified the remainder of this remarkable voyage, and the steamer cast anchor at the dock-gates in the Thames on the 30th of September. *It will thus be seen that the voyage extended over barely two months, and that the difficulties contended with were not perpetual winter and impenetrable ice, but bad charts, shallows upon which the depth of water varies, and insufficient means of loading at the Siberian harbours.* A little time will present all these matters in a very different light to the mariner navigating the seas of Northern Asia, and the success of Captain Wiggins' voyage will most probably lead to a great development of commerce with this part of Russia. During the two months occupied by the expedition the weather was warm and pleasant, and no hardships resulting from change of climate had to be endured. The cargo brought to London was the first that had been ocean-borne from Siberia direct to an English port. The wheat which formed part of it was pronounced by the experts to be some of the finest that had been imported into London; and the isinglass, linseed, flax, &c., carried by the *Warkworth* were also described as first-class in quality.

No. 18.—1878: The brig, *Express*, sailed from London with a

full cargo, for the Yenisei, to be towed through the Kara sea by the steamer, *Fraser;* both belong to Mr. Sibiriakoff; the *Express* returned to London with a full cargo of wheat and rye. The double journey was successfully accomplished without any accident. Some large iron barges and a shallow steamer have also been sent out to the Yenisei.

No. 19.—1878: A Dutch expedition, in a small sailing schooner, the *Willem Barentz*, fitted out at the expense of the Dutch Government, sailed from Holland, in May, and cruised in the Northern Seas, visiting the Kara sea, and proceeding far to the northward; landed at Barentz Haven in Novaya Zemlia, and returned home to Holland in safety, in October. This voyage would appear to be preparatory to an Arctic expedition.

Thus far we have briefly narrated the results of five seasons' exploration—partly scientific, and partly commercial—in the Arctic Seas to the north of Europe and Asia; and it seems to be not improbable that, when an improved plant in the shape of powerful steam-tugs and capacious lighters is provided at the Siberian centres of commerce, a steady and profitable trade, during the navigable season, may be carried on between Western Europe and Siberia by a small fleet of light draught steamers especially fitted for the shallow waters at the estuaries of the Obi and Yenisei rivers. It is reported, and we hope with some truth, that active measures are already in progress for the prosecution of new ventures during the forthcoming season, and Captain Wiggins, with Mr. Cattley and his friends, is still to the fore.

It remains to remark that the most important expedition yet undertaken in these waters is that under the leadership of Professor Nordenskiöld at the joint expense of the Swedish Government, Mr. Oscar Dickson and Mr. A. Sibiriakoff, in the *Vega*, for the solution of the North-East Passage, from Europe and thence through Behring Straits into the Pacific; but not this alone; the investigation of the route is to be especially scientific, and to this end most of the sciences are represented among the officers. It sailed in July, and the cruise has been so far successful that Cape Chelyuskin, the northernmost point of Asia, has been passed; but some distance beyond this the *Vega* was frozen in, where she

now remains awaiting the opening of the next season. To this adventurous voyage we purpose devoting some pages in our next number. The *Lena*, the consort of the *Vega*, commanded by Captain Johannesen, and owned by Mr. A. Sibiriakoff, is destined for the navigation of the river Lena. On parting from the *Vega*, she made for the river, and reached Yakutsk on 21st September; she is now however laid up in winter quarters.

THE CASE OF WILLIAM MULLENS.

WITHHOLDING AN OFFICER'S CERTIFICATE.

THE case of William Mullens, master mariner, who threatened Mr. Thomas Gray, of the Board of Trade, with "a sudden and violent death," brings into prominence a point that ought to have received the attention of the Legislature some years ago. There is no doubt that it would have received due attention had not the mind of the public been led away from questions affecting the real welfare of the mercantile marine by sensational agitation; which, whatever purpose it may have served, was, at least, the means of bringing into notice a member for an inland town, who otherwise would have remained in that repose which best befits him. We trust that now, when sensationalism and fiction have been played out, and have quite served their turn in regard to mercantile marine legislation, room may be found for some useful measures: and we also trust the first persons who may receive consideration will be those who form that long-suffering, useful, unobtrusive class, the masters and officers of British merchant ships. The seamen who form the crews, if they have not had done for them as against shipowners and officers, and as against the welfare and safety of merchant ships, all that an unreasoning agitation could have desired, have at least obtained so much that it is now found to be very difficult for shipowners, other than those owning large lines of ships, to look with a fair and proper degree of certainty for the fulfilment of

any articles of agreement into which those crews may enter. The points which require reconsideration are not very many, and can be treated of, from time to time, as fitting opportunities arise. At the present moment we propose to write a few words on the point suggested by the case of William Mullens.

We find on referring to the *Shipping and Mercantile Gazette* that some time in 1868, Mullens, being mate of the ship *Stonehouse*, on her way to Calcutta, exhibited symptoms of a strange character, for instance, directing the crew to crowd on a quantity of canvas, endangering the safety of the ship and all hands; that on arrival at Calcutta he absented himself, and was sentenced to four days' imprisonment; and that afterwards he was discharged by mutual consent. The master of the *Stonehouse* returned in due course to London in his ship, and Mullens arrived in another ship, the *Sallust;* and in February, 1869, was arrested on a warrant and taken to the Lord Mayor's Court, the charges against him being in substance, first, that he had seriously injured the health of the wife of the captain of the *Stonehouse* by misinforming her that her husband was dead; that he had further offered himself to her in marriage, addressing her in poesy, "Wife, how sweet the appellation," and by other terms of endearment; and secondly that he had threatened the life of the captain, as, to use his own words, he regarded "the imprisonment at Calcutta a degradation, which he at first resolved should be wiped out in the captain's blood, and that he was resolved, now as then, to obtain redress or death." This was followed by a letter to his captain, in which he informed him, "The man you have injured still haunts your steps." The mother of Mullens, and a male friend, declined to become securities for him, and had it not been that Mr. Gibson, the Surgeon of Newgate, reported that the prisoner was in a deranged state of mind, he would, as the Lord Mayor informed him, have had to undergo a long term of imprisonment. The Board of Trade cancelled his certificate, as they are empowered to do, he having been convicted and imprisoned for the offence of desertion. In the very next month Mullens was pronounced to be sane, and was discharged from custody; and in May or June, 1869, he received back from the Board of Trade his master's certificate of competency, which enabled him to start *de novo* as if he

had never been convicted for the offence of desertion, and as if nothing had happened to cast a shadow of a doubt on his fitness or sanity. If the Board of Trade then erred in the matter, as we think they clearly did, it was not because they were too severe on Mullens, but because they were too ready to give him back his certificate. It is not clear what Mullens was doing between 1869 and 1875, excepting that it came out that he had been confined more than once in a lunatic asylum, and had escaped; but in 1875 he seems to have been sent home from Calcutta, at the expense of the State, as a distressed lunatic seaman, and his certificate seems to have been sent to the Board of Trade, or, somehow, to have found its way into their possession. When Mullens himself arrived in this country his charge fell on the parish authorities, and they very soon relieved themselves of it by declaring him sane. It seems that ever since that time he has been urging the Board of Trade to return his certificate, which the Board have declined to do. From information we have been able to collect, it appears, amongst other things, that Mullens had been somewhat recently in prison at the Cape as a deserter and made his escape, and that he had, somewhat recently also, been sent home again as a distressed lunatic seaman: and, also, that one of the Local Marine Boards has reported him as insane and unfit to have a master's certificate. It is not for us to determine the question of his sanity or otherwise. He, himself, protests he is sane, and the doctors of Newgate and Colney Hatch say he is sane, except on the point of love-making to royal princesses and poetry. If he is sane, then his threats are all the more serious, and, according to the Lord Mayor, he must have improperly escaped a long term of imprisonment in 1869. One thing makes us think he is quite sane: viz., that he made a very clear statement of the facts of his defence when he was tried at the Old Bailey, and he was careful in all he said to keep the "cancellation" of his certificate in 1869, for conviction of the offence of desertion at Calcutta, quite distinct from what he called the subsequent "withholding" of it from him in 1875, after the old conviction for the offence of desertion was condoned by its return to him in 1869. It did not transpire in Court, on the last trial, whether the Board of Trade had again cancelled the certificate

for "any offence," or whether they are merely withholding it in the interests of the public without having cancelled or suspended it. However this may be, William Mullens thinks he ought to have it back. If he gets it he might be placed in command of a foreign-going ship with many hundreds of passengers, whose safety, morality, and comfort would be solely at his will. He foolishly sought to ensure a discussion on the merits of his case by threatening to murder Mr. Gray. He overlooked the fact that murder of, or a threat to murder an individual, is a crime by itself, and that in committing either the one or the other of those crimes, he could in no way plead in justification the fact that his professional status is not what it was, or that a department of the State has, as he may think, wronged him or treated him harshly.

But the point to which we desire to draw attention is this. In cases when the owner of a ship thinks that the Board of Trade wrongly detains the ship, or wrongly declines to give her a certificate, and in cases in which a seaman or two allege that their sleeping-places are not what they should be, or allege that the ship is overloaded, or in any way defective, they can, in their own interests, and as against all parties, appeal to a Court of Survey, which has been specially appointed to see right done, in the one case, between the shipowner and a powerful department of the State; and in the other case, between seamen alleging themselves to be aggrieved and the owners. The only persons who have not this power of appeal for protection are the masters and officers of British ships. What appears to be needed, is some provision whereby the holder of a certificate may appeal to a competent court, or to have his case tried by a jury, when he thinks that his certificate is improperly withheld. For our own part, we cannot understand why the Legislature, which gives the wealthy shipowner special and cheap means and unheard of facilities, apart from and beyond the ordinary courts of law, to aid and even encourage him to appeal against the action of the Board of Trade in regard to a chronometer, or the fitting of a boiler, or a life-buoy, should deny to the master mariner a special means of appeal in regard to himself. The question of the fitting of a pipe may be a very interesting one, and

may raise many minute interesting points, on which engineering and shipbuilding talent may not altogether inappropriately let off its superfluous ingenuity and effervescing energy, but it seems after all to any one but those interested, merely a peddling technical squabble. Yet the law has created and offers special facility for it. The question of withholding a master's certificate is one of high importance, and may often involve professional disgrace and ruin, and State machinery and aid provided in the one case is withheld in the other. The reason is obvious. Shipbuilding and engineering firms are, if not powerful, at all events troublesome and clamorous; they have party influence, and must be attended to. Seamen found a champion, as against their employers and as against their officers, and have obtained exceptional advantages through an unreasoning agitation of a party character, which had to be assuaged by the sacrifice of sound doctrine, sound principle, and fact; officers of the mercantile marine are an unobtrusive body, powerless in politics for party purposes; and they have never found a champion who could make their case his own. To justify William Mullens would be wrong in the extreme; but to neglect to extract from his case the obvious and prominent fact that officers of British ships have a grievance which calls for consideration would be worse. The German law, which is based on the English, gives masters and officers an appeal against the decision of the Wreck Court. Our pages have not gone so far as to advocate an appeal from the Wreck Commissioner's Court. The judgments of that Court are, we learn, such as could not be appealed against with success; and, if they do not give universal satisfaction to the parties whose certificates are cancelled or suspended, are at least acquiesced in by them; but what we think is that the Legislature should give to officers facilities for discussing and investigating the "withholding" of their certificates at least as cheap and great as those given for discussing the withholding of a certificate on account of a safety-valve spring, a forecastle, a chain cable, a soil pipe, or an anchor light.

CAN WE RAISE A COLONIAL NAVAL RESERVE IN THE AUSTRALIAN COLONIES?

IT having been proposed by Mr. Thomas Brassey, in a paper read at the Colonial Institute to form a colonial naval reserve of seamen and sea-going men, it may not be amiss to consider what these colonial seamen are like, and whether they are likely to volunteer or not. By the term colonial seamen we mean those who man the vessels belonging to, and trading between, the ports of the Australian Colonies and New Zealand, or, as it is termed, the inter-colonial trade; and the writer having sailed some seventeen years in English-owned vessels, and seven years in a colonial-owned vessel, foreign and coasting, he may perhaps be allowed to give an opinion of the general character and ability of our colonial seamen.

First, with regard to their naturalization, we have among us men of every European nation, and of some American ones also; as an example, I may take my present crew, consisting of seventeen all told, who are of the following countries, viz.:—

British	8
Do. (Australian born)	1
Sweden	2
Norway	1
Germany	1
U.S.A.	1
Chili	1
Greece	1
Manilla	1
	17

But of whatever nationality these men may be, they are as a rule a law-abiding, sober body of men, whose ability as seamen, and character as men will compare favourably with any class of seamen afloat. The work they do in some of the coasting and inter-colonial trades is hard work, notably the coal, wheat, and flour trader; in many

cases having to load and discharge their cargoes themselves. These trades are every year developing; and it is to this coasting and inter-colonial trade that we must look for a nursery for any reserve we may wish to raise in the future. That it would be found a good one there can be no doubt, for the steady, hard-working portion of these men cannot be tempted to leave the coast; and masters of ships going abroad know, however high the wages they offer, they seldom get hold of the regular coasting seaman, as he prefers to remain on the coast at £5 per month to leaving it at even £7 or £8; and they have often to take the boarding-master's selections, or go without.

From this it would seem that our colonial seaman is always to be found somewhere on the coast; he may trade between New South Wales and South Australia one articles of agreement, and between New South Wales and New Zealand or Tasmania the next, but will very rarely be found leaving the coasts of the Colonies. Many of these men have honourably worked their way out here at 1s. per month, because they saw the Colonies opened out a better field for them. Once these men marry they seldom remain at sea, usually obtaining employment on shore, in and about our ports and rivers; so that they would be still eligible for reserve men, and doubtless the pay would be acceptable to them.

The next point for consideration is whether these men are likely to come forward and enrol, and what the inducement must be for them to do so, for there will have to be an inducement. If they were offered, say, £7 for the 28 days in the year they are doing drill (steamers pay their hands £6 to £7 per month), and besides this a yearly retaining fee of £5, the latter only to be paid on completing five years' service, or a land order equal to that amount, with a suit of drill clothes per annum, there would be found plenty to come forward and enrol; perhaps they might feel a little diffident in coming forward at first, but when they saw the advantages to be gained I think they would respond. These men might also have the preference of situations under the Customs, river police, and marine boards, either during or on completing their service.

As regards the number of men employed in colonial-owned vessels, the register of Australian and New Zealand shipping,

published in Melbourne for 1878-9, shows the tonnage owned by the various colonies to be as follows :—

Colonies.	Sailing Vessels.		Steamers.		Total.	
	No.	Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
New South Wales	475	58,796	228	30,249	703	89,045
New Zealand ...	424	31,671	102	15,772	526	47,443
Queensland	53	2,573	32	2,052	85	4,625
South Australia	185	21,741	66	9,732	251	31,473
Tasmania	195	16,685	14	3,951	209	20,636
Victoria............	269	42,672	80	21,626	349	64,298
Western Australia	107	6,364	6	277	113	6,641
Total	1,708	180,502	528	83,659	2,236	264,161

From the above it will be seen that we have 264,161 tons owned in the colonies; and if we allow two men per 100 tons (rather a low estimate) we get a body of men amounting to 5,283, from which, if we deduct one-third for men who may be in river-steamers, and who may not be able to produce any sea-service; or who may be over or under age; or who may not pass the doctor, and this is probably too great an allowance, we have still 3,522 left from which to raise a naval reserve force, and with the inducements mentioned I think we might rely upon getting at least 2,000 to enrol. The expense to the colonies would be as follows, per head :—

	£	s.	d.
A month's drill money, paid on finishing drill ...	7	0	0
A yearly retaining fee, paid on the completion of five years' service, or land grant*	5	0	0
Expenses of management, instruction, and cost of drill suit, &c.	3	0	0
Total of cost per head per annum	£15	0	0

* This to be forfeited in whole or part if they did not complete their service.

which, if we raise a force of 2,000, would entail an annual expense of £30,000 to the colonies before mentioned. This sum might be borne by the colonies, either according to the population per head, or each colony might elect to have and maintain a certain number, but in either case they should mutually arrange that the men should be allowed to do their drill in any port of any colony where there was a drill ship, whether it was in the colony in which they were enrolled or not. The men would thus have greater facilities offered them for obtaining employment, and would still be at hand if wanted; the stipulations being, that not less than 14 days drill be done at one time, and that 28 days drill be done every year; and that they should not be allowed to leave the coasting or intercolonial trades without a special permit from the government of the colony under which they had enrolled.

It has often surprised the writer that in all the recommendations for defence, a naval reserve has never been proposed for the colonies until Mr. Brassey's proposition; perhaps it was because the men appointed to report on the defences were military men. New South Wales has its naval brigade, who are taught the handling of big guns, but the majority of them are landsmen; they would doubtless be valuable for defence on shore, but for sea, well, they are not seamen, and it has been acknowledged that our greatest danger would arise from swift and heavily-armed vessels. To meet this danger it has been proposed to have at least one swift iron-clad for some of the larger and more prosperous colonies, and perhaps in the event of war it would be a very good thing to have one, still, if we wish to keep down the expenses, the crew might be kept down to a minimum during peace, and we might safely rely upon some of our reserve volunteering to man her during war time.

With regard to the officers for this force, the writer feels sure they would be forthcoming from the colonial marine upon the same conditions as those under which the Royal Naval Reserve officers are now enrolled; and I am sure that most of our colonial owners would grant us time to do our drill. This force, although but small, would be the nucleus of an armed body of seamen which, if necessary, could be increased as our population and coasting trades

increase; for our thousands of miles of coast line must, in the future, cause our coasting trades to be large and develop rapidly in proportion as the population increases.

The drill port or ports might be as follows :—

Colony.	Port.
New South Wales	Sydney; Newcastle.
New Zealand	Auckland; Dunedin.
Victoria	Melbourne.
South Australia	Port Adelaide.
Queensland	Brisbane.
Western Australia	Freemantle.
Tasmania	Hobart Town.

So that only two of the colonies would require more than one drill station, viz. :—New Zealand and New South Wales. The men on entering, would be required to produce a certain amount of sea service to the officers enrolling them; and, if necessary, a second class consisting of ordinary seamen might be formed as in the Royal Naval Reserve.

The writer may, in conclusion remark, that naval brigades have in the past done good service on shore, as well as sea, notably in the Crimea and India; for Jack is a sort of amphibious animal.

The writer also trusts that ere long the Australian colonies will take joint action in this matter, and that such action may probably lead to that which is so desirable—and which, sooner or later, must come—viz., federation, when, so far as defence is concerned, the whole of the Australian colonies will have interests in common.

MARSHALL SMITH,
Master Extra,
Mem. Roy. Soc. N.S.W.

Barque *T. L. Hall*,
Wallaroo, S. Australia,
January, 1879.

THE LIVERPOOL LABOUR DISPUTE.

THE determined resistance offered by the working classes to the reduction in the rate of wages necessitated by the depressed condition of trade, has recently manifested itself in connection with our great maritime industries. It is not surprising that this should be the case ; but we regret to have to record the fact, that with regard to the difficulties which have arisen at Liverpool between the shipowners and their employés, the struggle has been characterised, on the side of the latter, by a display of violence and ruffianism such as the country has fortunately not witnessed in connection with any trade dispute for many years. Labourers engaged in loading and discharging ships were violently attacked and maltreated, cargo, hoisting gear, gangways, and other property, were destroyed, engine fires raked out, and in fact, for a considerable time mob law was the prevailing order of the day.

Some allowance must of course be made for the interference of long-shore loafers and roughs eager for any opportunity of indulging their instinctive brutality, but after taking every consideration of this kind into account it is impossible to acquit from blame the labourers and seamen who were present while the work of destruction was in progress. Whatever the leaders of the strike movement may urge in favour of their followers, the broad fact remains, that thousands of these men stood by while the property of their employers was being destroyed, and while other men were being violently driven from their work. The authorities seem to have been taken more by surprise in the matter than the circumstances of the case would seem to justify. That a large number of men were on strike was a fact perfectly well known, yet no precautions appear to have been taken to prevent any disturbance, nor to protect the men who had been brought from other ports to fill the places of those who declined to accept the rate of wages offered. This is much to be regretted, as a large proportion of the working classes in this country seem to be quite ignorant of the fact, that every man has a right to dispose of his services on any terms he may

think proper to receive. It is high time, however, that they should become acquainted with this truth, and the authorities would do well to lose no opportunity of making it practically known.

To judge from the number of strikes which are constantly occurring, it might be supposed that the present is a time of unusual prosperity, instead of being one of considerable depression. Although the cry is everywhere being raised that foreign competition is steadily increasing in strength, the working classes seem bent on hampering their employers to the full extent of their power. In the case of the Liverpool strike, the utmost inconvenience, to say nothing of heavy losses, must have been caused to shipowners by the sudden refusal of the men to proceed with the work of stowing and unloading cargoes. A large number of vessels were detained many days beyond their proper time of sailing, while the mail steamships, which were bound to time, were compelled to sail with cargoes considerably short of the usual amount. To add to the general state of confusion which prevailed the seamen joined the strike, and demanded an increase of 10s. per month on the existing rate of pay. The advance note seems to have come in for a certain share of abuse, the men complaining of the high rate of interest they have to pay for cashing their old friend. The difficulties caused by this untimely demonstration of the labourers and seamen were met with great vigour by the employers. Some thousands of men were obtained from the Clyde and from Bristol within two or three days from the commencement of the strike, and we have no doubt that by this time a considerable proportion of the strikers are bitterly repenting of the part they played in the business.

The strike of the seamen seems to have been a confused and somewhat desultory affair. Indeed it could not well be otherwise. Jack is not in a position to offer a very prolonged resistance, since he must perforce go to sea as soon as his ready cash and credit are exhausted, a contingency which is never long in arriving. The crimp and boarding-house keeper are his steadfast supporters while he has wages in his pockets, and until the advance note for the new voyage has been discounted, but when these resources are

exhausted, he must ship for other climes. And since the greater portion of his time must necessarily be passed away from this country he cannot, like the mechanic or labourer on shore, combine with his fellows for the purpose of providing a strike fund. A seamen's union is practically an impossibility, as without the sinews of war a successful struggle cannot well be maintained.

To ordinary observers it would seem that a considerable proportion of the working classes of this country have taken leave of their senses. They appear to be decidedly of the opinion that it is preferable to receive nothing than to receive a reduced rate of pay. The whole of the uproar at Liverpool arose out of a proposed reduction of something like ten per cent. in the wages of only a certain section of the labourers. Those about whose pay there was no question, joined the strike out of apprehension that their turn might possibly come next; whilst the seamen hoisted their banner of resistance in the hope of regaining the rate of wages which was in force when the shipping trade was at its best. Shipowners are only too well aware of the necessity which exists at the present time for curtailing their business expenses in every possible manner. At this moment numerous vessels are lying idle, unable to obtain cargoes, whilst the bulk of those which are employed are barely paying their working expenses. The total amount of the United Kingdom exports and imports was lower for the year 1878 than for either of the two preceding years; and the returns for the opening month of the current year do not give any reason for anticipating a speedy revival in the future. It is quite certain, therefore, that employés will be compelled to submit to their share of the economies necessitated by this unfavourable condition of things. It must be admitted that they are somewhat unfortunately situated in the matter, for there is no doubt that the extremely low freights now being earned are, to a considerable extent, the result of an over-production of tonnage. The wave of unusual prosperity which passed over the country five or six years since was not without its effect on the shipbuilding trade; and the consequence was that tonnage was built largely in excess of the amount that has subsequently been required. The result is now manifesting itself

in the shape of a keen competition for freights, and as long as this intense competition lasts the downward pressure on the rate of wages paid in the shipping trade will be maintained. We believe the wages of seamen are as low at present as they have been at any time during the past twenty years; but although this is a state of things which is much to be regretted it is one against which it is useless to complain. Hitherto the seamen appear to have borne the whole burden of the reduction in wages, but at last other classes of labourers in the shipping trade have been forced to share the same fate. Fortunately the strike is now a thing of the past. The difficulties have been settled by the submission of the men to the stern necessities of the case, and the only relief to be hoped for is a return of more favourable times.

ON CERTAIN SHORT METHODS IN NAVIGATION.

By A. C. Johnson, R.N.

(*Continued.*)

ASSUMING that the observations are taken with ordinary care, an error of 30 miles in the longitude by account will seldom produce a greater error than 1 mile in the latitude: thus, in Example I., page 182, an error of 30 miles in the longitude has been assumed, and the resulting error in the latitude is 1 mile, while that in the longitude is 2 miles. In Example II., p. 183, an error of 45 miles in the longitude was assumed, and the resulting error in the latitude is 2 miles, while that in the longitude is 5 miles. Hence we see that, while such considerable errors in the longitude affect the latitude but slightly, the error in the longitude by account is in the first instance reduced by $\frac{14}{15}$ of itself, and in the second case by $\frac{8}{9}$ of itself. The error in the longitude due to an error of 1 mile in the latitude depends chiefly on the bearing of the sun at the observation *furthest* from noon. It will be readily seen from the following Table:—

Bearing	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°
Error (in dep.)	4′.7	4′.0	3′.5	3′.1	2′.7	2′.5	2′.2	2′.0	1′.9	1′.7	1′.6	1′.5

The position of the ship as found by these methods is for the time of the *second* observation.

We now proceed to show how the Table may be employed in solving double altitudes, when the observations are taken at an interval not exceeding three hours.

Arc (a) and arc (1) are found as in the preceding methods—using the half-interval instead of hour-angle; the remainder of the work may be seen from the following

Example.

Given Latitude D.R. 50° 10′ N., Times of Observation 10h. 30m. A.M., and 11h. 30m. A.M.; to find the position at the Second Observation.

	True Alts. ° ′		G.M.T. by Chro. h. m. s.		Declination. ° ′
	17·13		10·17· 0		20· 0 S.
	19·41		11·17· 4	Corr.	+ 10 (Tab.)
Sum	36·54	2)	1· 0· 4	Arc (1)	20·10
Diff.	2·28				
			30· 2		
		Corr.	− 1·51 (Tab.)		
			(*a*) 28·11		

	° ′				
½ Sum	18·27	Sine	9·50034	Cos.	9·97708
½ Diff.	1·14	Cos.	9·99989	Sin.	8·33292
	m. s.				
(*a*)	28·11	Sec.	·00329	Co-sec.	·91128
		Sec. (*b*)	·00610	Sin. (*b*)	9·22128
	° ′				
(2)	18·52	Sin. (2)	9·50962		
(1)	20·10				
				Sec. (*b*)	0·00610 (rep.)
Sum	39· 2			Sec.	0·10970
				Co-sec. Lat.	0·11580

Latitude 50°.0′ N.

For the Longitude.

		Sin (*b*)	9·22128 (rep.)
		Sec. Lat.	·19193
		Sin H.A.	9·41321
	h. m. s.		h. m. s.
G.M.T. at First Obs.	22·17· 0	Mid. H.A.	1· 0· 2
Half Interval	+·30· 0		24
Mid. G.M.T.	22·47· 0	Mid. A.T.	22·59·58
Mid. S.M.T.	23·10·18	E.T.	+·10·20
Longitude in time	·23·18	Mid. S.M.T.	23·10·18

Longitude 5°·49′·30″ E.

If both Observations are P.M., the H.A. is app. time.

If one is A.M. and the other P.M., subtract the H.A. from 24h. only when the A.M. alt. is less than the P.M.

Notes.

1.—In the above Example, the first altitude is supposed to have been corrected for run in the ordinary manner; and the declination is taken out for the middle time between the Observations.

2.—Take the sum or difference of arcs (1) and (2) according as the latitude and declination are of different names, or of the same name. When the ship is between the sun and the equator, take their sum.

3.—The above method, which is a modification of Ivory's, will be found very expeditious in practice—six of the logarithms employed being taken out in pairs, while several others repeat.

CORRESPONDENCE.

ADVANTAGES OF COLONIAL CERTIFICATES OF COMPETENCY.

To the Editor of the "Nautical Magazine."

SIR,—As a master extra in the Merchant Service I watch with considerable attention the very able and complete judgments and reports given by the Wreck Commissioner, and I observe that many of them are influencing merchant shipping matters in a degree very marked: and generally for good. I wish to call the attention of other masters to the important declaration contained in the Commissioner's "reasons" appended to the report of the Court in the case of the *Pawashick*, stranded on the Nash Sands, Bristol Channel. The vessel was in charge of a Cardiff pilot, who was below asleep in the cabin at the time, and no blame whatever attached to the master. It seems to have been clear from the first that the pilot was to blame, and it is also clear from the Wreck Commissioner's "reasons" that the Board of Trade raised the question whether the master ought not to have seen after the pilot, and should not be punished or reprimanded in some way for not having kept him awake and on duty. The judgment will be accepted with gratitude by all of us, and I for one can only regret with the Commissioner that he has no power to deal with pilots. The sooner he gets that power the better it will be for all who have to employ them. The Commissioner goes on to say, "with regard to the master, of course after the judgment we have pronounced, we should not, even if we had the power to do so, think of touching his certificate. But, as a matter of fact, I find the certificate he holds was issued by the authorities in Canada, and as I can see no reason for departing from the opinion I expressed in the case of the *Chillianwallah*, I should have no power to deal with such a certificate, even if I wished to do so." This is very right, and I have looked up the list of certificates and find it is one issued by the Canadian authorities similar in all respects to my own certificate of competency—and enables the holder to take charge of any British ship in any part of the world. I venture therefore

to advise my brother shipmasters to do as I propose to do myself, get a certificate of competency next time I go to a colony, as we shall then be possessed of a certificate that the Wreck Commissioner tells us he has "no power to deal with, even if he wished to do so." In these hard times it is our duty to do the best we can, and to save ourselves from the risk of suspension, and the suggestion contained in the remark of the Wreck Commissioner is gratefully acknowledged by,

Yours truly, AJAX.

P.S.—I give you the number of my certificate, but not for publication.

SHIPS' LIGHTS.

To the Editor of the "Nautical Magazine."

SIR,—In my letter of the 4th October (kindly published in your Magazine for November), respecting a few suggestions for the improvement of the Rule of the Road at Sea, I suggested the darkening of the side-lights to indicate the porting or starboarding of the helm as a system of signals. A Bristol correspondent in this month's Magazine states, he thought I was not clear on that point. I was doubtful about it answering as well for sailing ships as well as steamers, but it was one of two systems of night signals I have often thought of, and I thought it would be the means of starting something more beneficial from abler hands. The other system is the small, powerful hand-lanterns, with red and green bull's-eyes, to be used in the same way as the colours suggested for day signals, which would be available for either steam or sailing ships.

Your Bristol correspondent very justly complains of the present light carried by pilot boats, as it is impossible to tell how they are going. In my opinion a globe mast-head lamp, showing red and green a-head and bright abaft, viz., red from a-head to two points abaft port beam, green from a-head to two points abaft starboard beam, and bright around aft, making an arc of 112½° red, 112½° green, and 135° of bright light. I have been speaking to one largely in the trade, who says that a lamp can easily be so con-

structed, or on the new principle of side-lights, viz., having the outside glass bright, and the coloured on the inside, which gives a much brighter light.

The want of light being exhibited from an overtaken ship has been often felt; to obviate which I now suggest the present side-lights altered by putting a circle of bright glass in the after part of the lantern, there would then always be a bright light showing a-stern on either side, and much in preference to showing a light over the stern when required, as often a light that is only required occasionally is frequently not used at all, or possibly not ready when wanted, but by the alteration of the side-lantern we have a light continually showing a-stern. Of course there would have to be some alteration made in the reflectors.

Collisions at sea are so frequent that it behoves every one connected therewith to raise their voices for their prevention.

Apologising for thus trespassing on your valuable space, and thanking you for past kindness,

I am, Sir,

Your obedient Servant,

Neyland, A STEAMBOAT MASTER.

December 23, 1878.

[We have received a number of other letters on the subject of Ships' Lights, the Rule of the Road, and Collisions, but we have not space to publish them.—Ed. *N.M.*]

Australia—Victoria.—Flag for Government Vessels.—The flag directed by H. E. the Governor's proclamation to be carried by all vessels belonging to or permanently in the service of the Government of Victoria, has been approved by the Admiralty, and will appear in the Admiralty Flag-Book, viz., *five white stars*, representing the constellation of the Southern Cross, surmounted by an *Imperial Crown*.

WEATHER FORECAST FOR MARCH, 1879.

The Currents or Tendency of the Air over the British Islands for the Month of March, 1879.

Date.	Duration.	Force from S.	Force from E. or W.	General Direction from	Duration.	Force from N.	Force from E. or W.	General Direction from
Mar.								
1	10 h.a. to noon fol.	2	11	W. by S.	11 h.m. to 10 a.	1	5	E. by N.
2	11 a. „ 11 fol. m.	0	12	W.	Noon „ 11 a.	0	6	E.
3	11 m. „ midnight	1	5	E.	... ...	...	...	...
4	Noon „ „	3	4	E. by S.	0 m. to noon	3	11	W. by N.
5	3 a. „ 11 a.	4	4	E.S.E.	0 m. „ 3 a.	6	9	W. N.W.
„	... ...	...	...	...	11 a. „ 4 fol. a.	9	8	N.W.
6	4 a. to 11 a.	5	3	S.E.	11 a. „ 5 „	11	7	„
7	5 a. „ 11 a.	6	3	S.W.	11 a. „ 6 „	13	6	„
8	6 a. „ midnight	7	2	„	... ...	...	...	...
9	6 a. „ 1 fol. m.	7	2	S.S.W.	0 m. to 6 a.	14	5	N.N.W.
10	7 a. „ 2 „	7	2	„	1 m. „ 7 a.	14	4	„
11	8 a. „ 3 „	6	2	„	2 m. „ 8 a.	13	5	N.N.E.
12	9 a. „ 6 „	5	3	„	3 m. „ 9 a.	11	6	„
13	9 a. „ 9 „	4	3	S.W.	6 m. „ 9 a.	8	6	N.E.
14	10 a. „ 10 „	2	4	W.S.W.	9 m. „ 10 a.	4	9	E.N.E.
15	10 m. „ midnight	0	11	E.	... ...	...	...	...
16	11 m. „ „	3	11	E. by S.	0 m. to 11 m.	1	5	W. by N.
17	1 a. „ „	6	10	E.S.E.	0 m. „ 1 a.	3	5	W.N.W.
18	2 a. „ 11 a.	8	10	„	0 m. „ 2 a.	4	5	„
„	... ...	...	...	...	11 a. „ 3 fol. a.	4	5	„
19	3 a. to 11 a.	9	10	S.E.	11 a. „ 4 „	4	5	N.W.
20	4 a. „ 11 a.	10	9	S.W.	11 a. „ 5 „	5	4	„
21	5 a. „ 11 a.	11	9	„	11 a. „ 6 „	5	4	„
22	6 a. „ midnight	11	9	„	... .	...	...	...
23	6 a. „ 2 foll. m.	11	9	„	0 m. to 6 a.	5	4	N.W.
24	7 a. „ 3 „	10	9	„	2 m. „ 7 a.	5	4	N.E.
25	7 a. „ 4 „	8	9	„	3 m. „ 7 a.	4	4	„
26	7 a. „ 6 „	8	9	„	4 m. „ 7 a.	4	4	„
27	8 a. „ 7 „	6	9	W.S.W.	6 m. „ 8 a.	3	4	E.N.E.
28	8 a. „ 10 „	4	10	„	7 m. „ 8 a.	2	5	„
29	9 a. „ 9 „	0	12	W.	10 m. „ 9 a.	0	6	E.
30	9 m. „ 11 a.	1	5	E. by S.	11 a. „ 11 fol. m.	2	11	W. by N.
31	11 m. „ 11 a.	2	5	E.S.E.	11 a. „ fol. noon.	4	10	W.N.W.

Note.—Sun's gradients will probably make a retrograde movement during month, bringing back temporarily the Easterly current. From about the 1st to the 5th, S. Westerly; 6th to the 21st, N. Easterly; then S. Easterly; succeeded by S. Westerly towards end of month or beginning of April.

REMARKS.

1. The Table indicates

Strong		Westerly	tendency	from the	1st	to the	5th	inclusive.
Very	„	Northerly	„	„	6th	„	12th	„
„	„	Easterly	„	„	13th	„	19th	„
	„	South Westerly	„	„	20th	„	26th	„
	„	Westerly	„	„	27th	„	31st	„

2. Moon going South from the 3rd to the 14th.
   „ coming North „ 15th „ 29th.

3. The change from the Westerly to the Easterly currents takes place about the 11th—earlier in the North; and the change from the Easterly to the Westerly about the 19th—later in the North.

4. It may be observed that the force from E. or W., or the rotatory velocity, is uniformly high during the month. This will probably render the gradients steeper, and make the rising and falling motion more rapid.

5. The stormiest period will probably be from about the 6th to the 13th.

6. It must be borne in mind that these tendencies will usually form gradients for winds at right angles to their direction; for example, a N. Westerly tendency will form gradients for S.W. wind with a falling barometer, and for N.E. wind with a rising one.

D. D.

Gulf of St. Lawrence.—For some years past the Hon. P. Fortin, M.P. for Gaspé, Canada, has been urging the establishment of telegraphic communication from point to point across the gulf of St. Lawrence, and particularly with the islands of Anticosti and Magdalen, and that the wires should converge to one central point where a powerful steamer would be stationed in readiness to proceed out at very short notice. The object of this enterprise is to check the wrecking and pirating which are carried on by the inhabitants of some of the wild shores which border the Gulf, and to assist in opening up commerce with those parts. We learn from Mr. J. U. Gregory, the agent at Quebec for the Marine and Fisheries Department, who has recently been in London, that the advantages of such means of communication would be very great, and would tend to induce settlements and develope trade and agriculture in places which are now wild and inhospitable; besides putting an end to the wrecking business, and enabling timely aid to be given to vessels in distress. The desirability of such a scheme being carried out requires only to be made known, in order that the Canadian Government may be urged to take it up, and we trust M. Fortin's efforts will before long be crowned with success.

TIDE TABLES FOR MARCH, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge.		Hull.		North Shields		Leith.		Devonport.		Dover.		Weston-Super-Mare.		Liverpool.		Greenock.		Queenstown		Kingstown.		London Derry.		Brest.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	6 25	6 47	11 8	11 38	8 6	8 35	7 1	7 30	9 49	10 14	3 36	4 0	11 5	11 33	3 30	3 56	4 19	4 43	9 30	9 58	3 32	4 0	0 28	1 3	8 22	8 52
S	2	7 13	7 44	—	0 13	9 10	9 51	8 4	8 43	10 44	11 20	4 26	4 58	—	0 8	4 28	5 7	5 13	5 48	10 32	11 13	4 34	5 12	1 43	2 28	9 28	10 10
M	3	8 20	9 5	0 52	1 35	10 35	11 29	9 29	10 18	—	0 3	5 36	6 21	0 49	1 38	5 53	6 46	6 30	7 18	—	0 2	5 53	6 38	3 13	3 57	11 3	11 53
Tu	4	9 57	10 48	2 19	3 2	—	0 8	11 2	11 40	0 51	1 38	7 6	7 50	2 27	3 11	7 34	8 16	8 6	8 48	0 51	1 35	7 23	8 1	4 37	5 11	—	0 36
W	5	11 29	—	3 41	4 17	0 47	1 19	—	0 14	2 23	3 4	8 27	8 58	3 52	4 27	8 51	9 20	9 24	9 56	2 14	2 47	8 37	9 8	5 38	6 2	1 12	1 42
Th	6	0 5	0 34	4 46	5 8	1 47	2 7	0 41	1 1	3 40	4 11	9 22	9 45	4 57	5 23	9 41	10 2	10 20	10 43	3 12	3 36	9 33	9 56	6 23	6 44	2 5	2 27
F	7	0 58	1 21	5 29	5 50	2 27	2 47	1 21	1 41	4 36	5 0	10 8	10 31	5 49	6 13	10 22	10 42	11 5	11 27	3 59	4 22	10 17	10 35	7 4	7 24	2 48	3 8
S	8	1 43	2 2	6 11	6 31	3 6	3 25	2 1	2 21	5 24	5 45	10 53	11 15	6 35	6 57	11 2	11 22	11 49	—	4 42	5 2	10 53	11 12	7 44	8 4	3 28	3 48
S	9	2 20	2 40	6 51	7 11	3 44	4 4	2 41	3 1	6 6	6 28	11 37	11 59	7 18	7 39	11 42	—	0 11	0 32	5 23	5 44	11 31	11 51	8 24	8 42	4 8	4 28
M	10	2 58	3 18	7 31	7 51	4 24	4 44	3 20	3 39	6 50	7 10	—	0 20	7 59	8 19	0 2	0 22	0 53	1 14	6 5	6 26	—	0 11	9 0	9 18	4 48	5 8
Tu	11	3 38	3 58	8 11	8 32	5 4	5 25	3 58	4 20	7 29	7 48	0 42	1 4	8 38	8 57	0 43	1 4	1 35	1 55	6 47	7 7	0 32	0 54	9 38	9 58	5 28	5 48
W	12	4 18	4 39	8 53	9 14	5 47	6 9	4 42	5 4	8 7	8 27	1 26	1 48	9 16	9 35	1 25	1 40	2 15	2 35	7 28	7 49	1 16	1 38	10 18	10 39	6 9	6 30
Th	13	4 59	5 19	9 36	9 58	6 31	6 54	5 26	5 49	8 47	9 7	2 11	2 34	9 54	10 13	2 7	2 28	2 56	3 17	8 10	8 31	2 0	2 23	11 2	11 29	6 52	7 15
F	14	5 42	6 5	10 21	10 48	7 18	7 46	6 15	6 42	9 28	9 50	2 57	3 21	10 32	10 54	2 50	3 14	3 39	4 3	8 53	9 19	2 48	3 14	—	0 2	7 41	8 8
S	15	6 31	6 59	11 20	11 58	8 18	8 55	7 12	7 49	10 16	10 45	3 47	4 16	11 23	11 56	3 41	4 14	4 30	5 1	9 46	10 21	3 44	4 19	0 41	1 25	8 39	9 17
S	16	7 31	8 10	—	0 41	9 38	10 27	8 31	9 20	11 20	—	4 49	5 29	—	0 41	4 55	5 44	5 37	6 21	11 5	11 56	5 1	5 45	2 15	3 4	10 3	10 56
M	17	8 56	9 50	1 25	2 10	11 15	—	10 9	10 54	0 4	0 51	6 13	6 58	1 31	2 18	6 40	7 28	7 11	7 57	—	0 43	6 30	7 15	3 50	4 31	11 44	—
Tu	18	10 37	11 20	2 54	3 34	0 1	0 40	11 33	—	1 37	2 21	7 42	8 20	3 3	3 45	8 9	8 44	8 40	9 17	1 27	2 6	7 54	8 30	5 4	5 31	0 27	1 5
W	19	11 58	—	4 10	4 39	1 12	1 40	0 7	0 34	3 0	3 33	8 51	9 15	4 21	4 50	9 13	9 36	9 48	10 13	2 40	3 6	9 1	9 26	5 55	6 16	1 36	2 0
Th	20	0 29	0 52	5 3	5 28	2 2	2 22	0 56	1 16	4 0	4 24	9 38	10 0	5 16	5 40	9 56	10 15	10 35	10 56	3 29	3 51	9 49	10 9	6 36	6 56	2 21	2 40
F	21	1 13	1 32	5 42	5 59	2 41	2 57	1 36	1 53	4 46	5 6	10 19	10 38	6 0	6 20	10 32	10 49	11 16	11 34	4 10	4 28	10 26	10 41	7 14	7 32	2 57	3 14
S	22	1 51	2 7	6 16	6 33	3 13	3 27	2 10	2 25	5 25	5 42	10 54	11 10	6 37	6 54	11 4	11 19	11 51	—	4 44	4 59	10 55	11 9	7 48	8 2	3 29	3 44
S	23	2 22	2 36	6 49	7 4	3 41	3 55	2 39	2 53	5 57	6 12	11 27	11 44	7 10	7 25	11 34	11 49	0 7	0 23	5 15	5 31	11 23	11 38	8 16	8 30	3 59	4 14
M	24	2 51	3 6	7 19	7 34	4 10	4 25	3 7	3 21	6 27	6 42	—	noon	7 40	7 55	—	0 4	0 39	0 54	5 47	6 2	11 53	—	8 44	8 57	4 29	4 44
Tu	25	3 20	3 34	7 49	8 4	4 40	4 55	3 35	3 50	6 55	7 8	0 16	0 32	8 9	8 23	0 19	0 34	1 9	1 24	6 17	6 32	0 8	0 23	9 10	9 24	4 59	5 13
W	26	3 50	4 4	8 19	8 34	5 10	5 25	4 5	4 20	7 21	7 34	0 48	1 4	8 37	8 51	0 49	1 4	1 39	1 54	6 47	7 2	0 39	0 55	9 38	9 52	5 27	5 41
Th	27	4 19	4 33	8 48	9 3	5 41	5 58	4 35	4 52	7 47	8 1	1 21	1 38	9 5	9 19	1 19	1 34	2 9	2 24	7 17	7 33	1 11	1 27	10 6	10 23	5 57	6 14
F	28	4 48	5 3	9 20	9 37	6 15	6 32	5 9	5 27	8 15	8 30	1 55	2 12	9 34	9 49	1 50	2 7	2 40	2 56	7 49	8 5	1 44	2 1	10 40	10 59	6 31	6 49
S	29	5 19	5 37	9 55	10 14	6 50	7 11	5 46	6 8	8 45	9 2	2 30	2 49	10 4	10 21	2 24	2 42	3 13	3 31	8 22	8 42	2 20	2 41	11 24	11 54	7 8	7 31
S	30	5 57	6 20	10 38	11 8	7 37	8 0	6 32	7 0	9 22	9 46	3 10	3 34	10 41	11 7	3 4	3 29	3 53	4 17	9 5	9 32	3 4	3 31	—	0 29	7 57	8 25
M	31	6 46	7 16	11 44	—	8 40	9 19	7 35	8 14	10 16	10 51	4 2	4 34	11 40	—	4 0	4 37	4 46	5 20	10 5	10 45	4 5	4 43	1 9	1 55	8 59	9 42

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add.* − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 8	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 8	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

176. James Vivian, Mylor Bridge, Cornwall. "Improvements in steam and other capstans, part of said improvements being applicable to steam winches."

198. Henry Augustus Severn, South Kensington, Middlesex. "Improvements in mariners' compasses, and in appliances used in connection therewith, for indicating deviations from the ship's true course."

258. James Harrold Barry, Pentonville Road, Middlesex, Master Mariner, R.N.R. "Improvements in apparatus for hoisting, lowering, and disengaging ships' boats."

266. Whitmore Baker, Totnes, Devon. "An improved gaff or apparatus for landing fish."

267. Ebenezer John Robertson, Ipswich, Shipbuilder. "Improvements in or applicable to ships and vessels for lessening the effects of collision."

291. Richard Robinson, Sunderland. "Improvements in the method of signalling on board ship, and in means or apparatus to be employed therein."

338. Francois Joseph Fortuné, Ailhaud, Paris, France. "Improvements applicable to submarine telegraphy."

345. John Scoffern, of the Waterproof Paper Factory, Willesden Junction, Middlesex, Bachelor of Medicine. "Improvements in sheathing iron and steel ships."

368. G. Martorelli and N. Soliani, Spezia, Italy. "Self-acting life apparatus."

390. George Watson, Durham, Colliery Inspector. "An improved protecting coating for ships, telegraph cables, and other structures or materials."

409. Julius von Binzer and Edward Beutzen, Salzburg, Germany. "Improvements in apparatus for propelling ships and other bodies through water or air; also applicable for turbines and such like hydraulic motors."

496. Albert Marcius Silber, Wood Street, London. "Improvements in ship and other lamps or lanterns."

518. Frederic Williams Eichens, Paris, France. "A new or improved astronomical apparatus for assisting the navigation or direction of route of ships and other vessels, also applicable as a school apparatus."

522. Flint Ramsay, Devon House, Forest Hill, Kent, and Josiah Henry Shoebotham, Birmingham. "Improvements in sail hanks."

ABRIDGEMENTS.

2254. William Cowley, Liverpool. "Improvements in and relating to apparatus for ventilating ships and other structures or spaces." This consists in suspending a cylinder from below the deck, in which works a piston, valves opening upwards being provided in the piston and bottom of the cylinder. A pillar is let into the deck by means of a socket above the cylinder carrying the bearings for the crank shaft. This part of the apparatus above deck is entirely removable, and the holes can be plugged up. The piston is provided with a wide india-rubber flange, and the central part of the interior of the cylinder contracted in order that the rubber flange being compressed by the narrower part at each end of the stroke of the piston may always drag.

2301. Loftus Perkins, Gray's Inn Road, Middlesex. "Improvements in propellers for ships and vssels." This consists in making the face of each blade of the propeller a screw surface. The boss occupies only a part of the length of the propeller, leaving in the rear a conical space between the end of the blades and the boss. The outer and inner edges of the blades are made parallel to each other.

2344. Noah Smith Woodward, Sherbrooke, Quebec, Canada. "An improved horn or whistle apparatus, chiefly designed for the protection of ships in foggy or stormy weather." This consists of two cylinders, held in axial position by brackets, and provided

with pistons, upon the same piston rod, the upper one being a steam cylinder, and the lower one an air cylinder. Steam being admitted into the upper cylinder below the piston, causes both pistons to ascend. The air is thus forced out of the lower cylinder through a horn or whistle provided for the purpose. By an arrangement of levers operating on a valve, the apparatus is rendered automatic, and produces sounds at regular intervals for the purpose of signalling.

2408. John Louis Lay, Paris, France. "Improvements in the construction of torpedo boats, and in apparatus to be used in connection therewith." This consists in constructing the hull of the boat in three distinct portions—a central and two side portions—to increase the stability of the boat, and also to afford better accommodation for the cable and apparatus. The movements of the boat are controlled by an electric current transmitted from the shore through the cable carried by the boat, and connected with the shore. A water chamber is provided in the hull of the boat, by filling which the boat can be submerged to prevent her capture or destruction. When it is desired to sink her, an electric current is transmitted in one direction through two electro magnets which, by a series of levers connected with the armatures of the magnets, operates upon a valve admitting gas in front of a piston, the movement of which opens an air cock. The air thus escaping allows the entrance of the water, and the boat immediately sinks. To raise her a current is sent in the opposite direction, allowing the gas to pass into the water chamber, thus expelling the water and raising the boat. A single wire serves all the purposes required for controlling the boat exclusive of firing the magazine, a series of relays, or resistance coils, being provided to direct the current to the different apparatus.

2466. William Munton Bullivant, Fenchurch Street, London. "Improvements in the manufacture of torpedo nets." This consists of working each grummet (or ropelike rings worked in steel wire) in its place in the net through rings already on two other grummets, this plan rendering the net very flexible and easily handled. The net is surrounded by a chain, each link of which is worked into it.

2503. Sir James Liston Foulis, Colinton, Midlothian, Baronet, "New or improved apparatus or appliances for preventing the entrance of water into and for ventilating boats or vessels, the same being especially adapted for enabling boats of small dimensions to proceed to sea with safety." This consists of a plate of metal fixed upon a ventilating shaft or on any other convenient part of the vessel, having in it openings. Upon the exterior of the plate and covering the openings, flaps, or valves are hinged and are so arranged, that when in their normal position, they hang free of the plate and thus allow of the free passage of the air, but when subjected to a sudden rush of water, they close against the plate. To the interior of each valve is fixed an arm to which are attached two ropes, one from each arm passing over one common pulley fixed above and the other hanging free, by which arrangement the valves may be kept closed or open as desired.

2512. Charles Ross Simey, Sunderland. "Improvements in closing and opening the water-tight doors of ships." This consists in providing each door, which is fitted to slide up and down in a frame as usual, with a suspension rod carried up to the main deck. The door is kept open by means of a key passing through the rod, and resting on a bolster fixed upon the deck. A rack is formed on the rod, into which a worm is geared, working on a slide, enabling it to be thrown in and out of gear with the rack, and serves to open the door. By knocking out the key, which keeps the door open, it immediately falls by its own weight. Should a suspension rod be inconvenient, the door may be provided with a counter-balance, and opened by means of handles.

2552. Charles Dubois, Marseilles, France. "Improvements in, and in the manufacture of, paints or compositions for preventing the fouling of ships' bottoms." This consists of the combination of a liquid called "chlorinated oil" with sulphocyanide of copper and colouring matter. The first named ingredient is prepared by incorporating chlorine gas with oils, volatile oils, resins and hydrocarbons. The proportion of chlorinated oil and sulphocyanide of copper should be altered according as mollusca or marine vegetation abound in any particular sea, as the latter ingredient has the greater effect upon mollusca, and may be omitted altogether in the other case.

AMERICAN.

209882. Giovanini and Bennerscheidt. "Water gates."

209901. Krebs. "Steering paddle-wheels."

209938. Stockwell. "Means for launching lifeboats."

209960. Davis. "Outrigger-boats."

210066. Thomson. "Mariners' compasses."

210067. Thomson. "Deep-sea sounding apparatus."

210068. Thomson. "Devices for taking azimuths."

210069. Thomson. "Mariners' compasses."

210908. Bourke. "Raising and lowering boats."

210951. Mathiesen. "Sail-hanks."

210982. Armit. "Screw propellers."

211016. Hubbard. "Screw propellers.

BELGIUM.

46866. Giese. "A submarine torpedo-fuse."

46867. Monoyer. "Propelling vessels by artificial currents."

GERMANY.

4446. Glomb. "A rowing apparatus for boats."

CANADA.

8289. Perkins. "Marine and stationary engines."

8297. Carroll. "Nautical logs."

8325. Bourke. "A boat-launching apparatus."

8333. Bourke. "Lifeboats."

8354. Buck. "An anchor."

8379. Robins and Gorham. "An anchor tipper."

8468. Waring and Allison. "Mechanism for opening and closing doors of hatchways."

8507. Marshall. "An anchor."

8784. Osgood. "Clutches for jib-sheet travellers."

8791. Stockton. "An anchor."

8825. Bingham and McTighe. "Low-water signals."

8848. Peppard. "Ships' windlass."

8878. Price. "River and fish-way registers."

8883. Spelman. "Row-locks."

8902. Têtu. "A mode and apparatus for drying fish."

9157. De Wolf. "Ships' pumps."

FRANCE.

125549. Yarrow. "Improvements in ships, steam vessels, and in the machinery and apparatus used therefor."

125438. Pinet and Fleuret. "A propeller with straight threads."

125479. Philippe. "Arranging ships' propellers and distributing motive power."

125506. Brice. "Apparatus for launching or detaching ships' or long boats."

125576. Ard. "An insubmersive armchair for sailors or bathers."

125701. Yates. "Improvements in armour-plates."

125725. Marrel. "Hooped steel armour-plates, &c."

125653. Coston. "Improvements in pyrotechnic night-signals, and in the apparatus employed therefor."

125660. Lemoine. "An arrangement for launching ships' boats at once.

125680. Bonnardel and Pignet. "A method of steering boats."

125764. Carmagnolle and Berlandier. "Improvements in diving dresses."

125870. Arentz. "A machine for cleaning the sides and keels of ships."

125768. Muzey. "A steam-drag with a sifter."

125786. Claparède. "A boat with an independent bell."

125819. Dever. "A dredger."

125855. Calmels. "Cleansing weir-reservoirs."

125964. Nordenfelt. "Improved system of armour-plates for forts and ironclad ships."

125987. Vallet and Dujardin. "A propeller for navigation."

125946. Hitchcock. "Improvements in ships' lights."

125947. The Mediterranean Ironworks and Docks Company. "Arrangements in ironclads for preserving meat, &c."

125951. Cutlan. "Improved apparatus for cleansing the bottoms and sides of vessels."

125970. Lawrence. "Lowering, &c., ships' boats."

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
51	England—South Coast—Spithead	Proposed alteration in buoys.
52	English Channel—Alderney	Partial destruction of breakwater.
53	North Sea—North Hinder Light	Notice respecting a provisional light.
54	„ Netherlands—Hoek of Holland, &c.	Tidal signals by day and night.
55	„ Weser River	Intended temporary withdrawal of light-vessel.
56	„ Elbe River—Kugel Baake	Temporary discontinuance of light.
57	Denmark—Jutland—Hirtshals Point	Fog-siren and signals; also ice signals.
58	Baltic—Rugen Island—Cape Arkona	Alteration of fog-signal.
59	„ Greifswald Bay — Palmerort Light-vessel	Alteration of light.
60	Portugal—West Coast—Tagus River	Beacons for South Channel.
61	North Atlantic—Iceland—Reykjanes Point	Establishment of light.
62	Mediterranean—Spain—Valencia	Exhibition of light on East Mole.
63	„ Cyprus—Famagousta	New buoys and beacons.
64	Black Sea— Sevastopol— Cape Khersonese	Re-exhibition of light.
65	„ Kertch Strait—Cape Yenikali	Arc of visibility of light.
66	Africa—East Coast—Delagoa Bay	Cockburn light-vessel uncertain.
67	India—Bassein River	Position of telegraph cables.
68	Eastern Archipelago—Celebes Island—North Coast	Shoal coral ground.
69	Japan—Goto Islands—Kuga Channel	Sunken rock in South entrance.
70	Tasmania—Bass Strait—King Island	Intended light at Currie harbour.
71	Australia—New South Wales—South Solitary Island	Temporary light.
72	„ Queensland—Burnett River	Alteration of beacons and leading lights.
73	„ „ Pioneer River—Rocky Isles	New light on Flat-top islet.
74	„ „ Trinity Bay—Low Isles	New light.
75	„ „ Endeavour River—Cook Harbour	Leading lights at Cook Town.
76	South America—West Coast—Callao	New lights at landing place, and on dock wall.
77	„ Magellan Strait--Broad Reach—Sandy Point	Temporary light.
78	West Indies—Costa Rica—Port Limon—Grape Cay	New light.
79	„ Nassau Harbour — Hog Island	Arc of visibility of light.
80	„ Cay Sal Bank—North Elbow Cay	Range of visibility.
81	United States—New Jersey—Tucker's Beach	Alteration proposed in light.
82	„ Maryland—Jane Island	Lighthouse destroyed by ice.
83	Canada—St. Lawrence Gulf—Pictou	New light.
84	„ Nova Scotia—Liverpool Bay	Permanent light on Brooklyn Pier.
85	„ Bay of Fundy—Isle Haute	New light.
86	„ „ Kingsfort Pier	New light.

NAUTICAL NOTICES.

51.—ENGLAND.—*South Coast.—Spithead.—Proposed Alteration in Character of No-Man's Land and Horse Fort Lights.*—About 1st April, 1879, the following changes will be made, viz.: No-Man's Land fort light will be changed from fixed red to *fixed white*, also showing a *red* sector of about 14° in extent covering the Ryde sand head and the Sturbridge shoal. Horse fort light will be changed from fixed white to *fixed red*. Further notice will be given.

52.—ENGLISH CHANNEL.—*Channel Islands.—Alderney Harbour.—Destruction of Seaward End of Breakwater.*—During a violent gale from the eastward on the night of 8th January, 1879, the seaward end of the breakwater at Alderney was washed away; and the breakwater is farther breached for a distance of 400 feet from the extremity.

Caution.—As the seaward end of the breakwater is now covered at high water, and scarcely visible at half tide, it is very dangerous to navigation.

53.—NORTH SEA.—*Provisional Alteration in North Hinder Light.*—Whenever the apparatus of the light shown from North Hinder light-vessel is out of repair, a *fixed white* light will be exhibited in lieu of the flashing light, and a *flare* light will be shown every *ten minutes* just above the bulwarks.

54.—NORTH SEA.—*Netherlands.—Tidal Signals.*—A general code of *Day tidal signals* (*Balls and Cones in various positions*) has been adopted for the coast of Holland. It is now established at Hoek of Holland canal, and at Noordzee (Ymuiden) harbour, to denote the depth of water at the entrances. In connection with the balls and cones, a *blue flag* indicates 4 inches more than the depth signalled, and the hoisting of a square indicates danger. Also, during flood tide and when the state of the wind and weather will permit, the signals are shown from the pilot-vessel stationed on Hinder bank, to indicate the depth of water on Bokke gat bar, Goeree channel, Maas river. The cones are shown from a yard on the fore-mast; the balls half-mast high. Flood, ebb, and danger signals from the main-mast; blue flag from the mizen-mast.

During flood tide—White flag with diagonal black cross and black pendant over is shown.

During ebb tide—The same flag with black pendant under it.

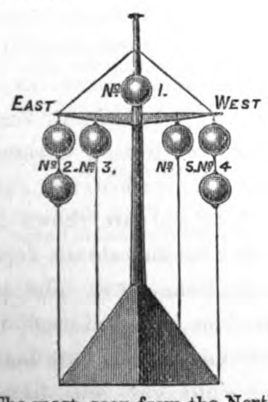
Also, *Night tidal signals* are shown at Hoek of Holland canal to denote the depth of water at entrance. The signals are *white* lights in various positions on the lower, middle, and upper yards, attached to a mast, and are given for every 8 inches of tidal rise, whilst the depth is greater than 10½ feet: they are shown from a mast on the north side of the canal entrance, when the tide gauge can be accurately observed.

55.—North Sea.—*Weser River.—Intended Temporary Withdrawal of Weser Light-vessel.*—To be withdrawn from her station at Weser river entrance, on 1st July, 1879, but will be replaced in position probably on 6th July, 1879.

56.—North Sea.—*Elbe River.—Temporary Discontinuance of Kugel Baake Light.*—Discontinued until further notice.

57.—Denmark.—*Jutland.—Fog-Siren and Signals at Hirtshals Point Lighthouse.*—The fog-signal is a siren-trumpet, worked by a caloric engine, which during thick or foggy weather will give *two* powerful blasts in quick succession every *two minutes;* it is placed 124 feet north-west of the lighthouse. Also, in order to indicate that one or more of the light-vessels in the Kattegat have left their stations, either from the state of the ice or other reason, the following signals will be shown at Hirtshals point, during the time the vessel is not at her station:—

By day.—From a mast with a yard, placed about 66 yards westward of the lighthouse.



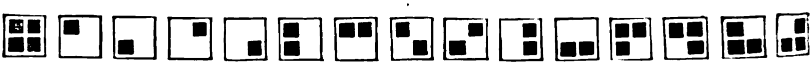
The mast, seen from the North.

A globe on the mast above the yard, when Trindelen light-vessel is not at her station. Two globes at the eastern yard arm, when Kobbergrund light-vessel is not at her station. A globe at the quarter of the eastern yard, when Knoben light-vessel is not at her station. Two globes at the western yard arm, when Laeso light-vessel is not at her station. A globe at the quarter of the western yard, when Skagen light-vessel is not at her station.

At night.—From an *auxiliary light* on the north-west side of Hirtshals lighthouse, elevated 137 feet above the sea, there will be exhibited:—A *red* light when Laeso light-vessel is not at her station. A *green* light when Trindelen light-vessel is not at her station. A *white* light when Laeso and Trindelen light-vessels are not at their stations. The light will be shown in a north-westerly direction, through an arc of about 60°; the white light visible 9 miles; the coloured lights, 5 miles.

Ice Signals.—When the state of the ice at the stations of Vinga, Elsinore, Sœby or Frederikshavn, is such as to impede the navigation at those places, the following signals will be shown by means of black tables, hung out on the white painted surface beneath the gallery on the north-west side of Hirtshals lighthouse:—

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15.



1. Ice in Vinga sound, at Elsinore, at Frederikshavn, and in Laeso channel.
2. Ice in Vinga sound preventing the navigation.
3. Ice at Elsinore prevents entering the harbour.
4. Ice at Frederikshavn prevents entering the harbour.
5. Ice in Laeso channel preventing the navigation.
6. Ice at Vinga sound and at Elsinore.
7. Ice in Vinga sound and at Frederikshavn.
8. Ice in Vinga sound and Laeso channel.
9. Ice at Elsinore and Frederikshavn.
10. Ice at Frederikshavn and in Laeso channel.
11. Ice at Elsinore and in Laeso channel.
12. Ice in Vinga sound, at Elsinore, and Frederikshavn.
13. Ice in Vinga sound, at Frederikshavn, and in Laeso channel.
14. Ice in Vinga sound, at Elsinore, and in Laeso channel.
15. Ice at Elsinore, Frederikshavn, and in Laeso channel.

Note.—In order to form correct knowledge of the state of the ice in the Kattegat, the globe signals should be compared with the table signals. When the globe signals indicate that the light-vessels are not at their stations, ice may be met with, whether the

table signals are shown or not. When a white or green light is shown, thereby indicating that Trindelen light-vessel is not at her station, it is probable that Kobbergrund light-vessel is also not in position, as this vessel is generally withdrawn earlier than Trindelen light-vessel. In this case, Knoben light-vessel will probably have been withdrawn, and the auxiliary light from Anholt lighthouse will then be shown. Further information as to the light-vessels in the Kattegat, may be obtained by exchanging signals with the semaphore at Hirtshals.

58.—Baltic.—*Rugen Island.—Alteration in Fog-signal at Cape Arkona.*—With reference to Notice 14, p. 80 (January), on the establishment of a fog-signal near Cape Arkona lighthouse, Wittow peninsula, Rugen island, during thick and foggy weather, the siren-trumpet will give *one* blast of from *five to six seconds'* duration at intervals of from 70 to 80 *seconds.*

59.—Baltic.—*Greifswald Bay.—Palmerort Light-vessel, Alteration in Light.*—On replacing this light-vessel in the ensuing summer, at her station in Baggerinne channel, west side of Greifswald bay, instead of the fixed red light, two *fixed white* lights will be exhibited, placed vertically, elevated 36 and 26 feet respectively above the sea.

60.—Portugal.—*West Coast.—Tagus River Entrance.—Beacons for South Channel.*—The beacons are situated as follows, and the three in line indicate the fairway of the South channel between North and South Cachopos :—(1.) On Jacobs Ladder ; (2.) On a hill nearly midway between Jacobs Ladder and the Paps ; (3.) On the Paps.

61.—North Atlantic.—*Iceland.—South-West Coast.—Light on Reykjanes Point.*—It is a *fixed white* light, elevated 180 feet above the sea, and visible 19 miles. Position as given, lat. 63° 48′ 10″ N., long. 22° 41′ 20″ W. Shown from 1st August to 15th May following.

62.—Mediterranean.—*Spain.—East Coast.—East Mole Light, Port of Valencia.*—Exhibited from the extremity of the works in progress, and will continue until the mole is farther extended. It is a *fixed red* light, elevated 39 feet above the sea, and visible 9 miles. Position as given, lat. 39° 27′ N., long. 0° 18′ 45″ W.

63.—MEDITERRANEAN.—*Cyprus.—East Coast.—Famagousta.*—A *cask* buoy painted black, with staff and ball, has been placed to mark the northern end of the narrow line of reefs and shoal ground running parallel to the shore northward from Missinisi island; it lies in 27 feet water, 35 yards N.N.W. of a rock with 21 feet on it, and two cables S. by E. from a detached rock of 26 feet, on the following bearings:—Leading beacon, W. by S. ½ S., S$^{ly.}$, distant 5½ cables; west extreme of fortifications, S. by W. ½ W., distant 11½ cables; white rock (northernmost above water), S.S.E., E$^{ly.}$, distant 8½ cables. A beacon painted black and white in horizontal bands, has been erected on the shore margin, one mile northward of the walls of the town of Famagousta. This leading beacon kept in line with the sharp, isolated peak of Holy Cross mountain (situated 11 miles inland from Larnaca), bearing S.W. by W. ½ W., leads between the 21 feet and 26 feet rocks into the fairway entrance for the port of Famagousta in 34 feet water. A solitary conspicuous cypress tree in Varosha village (southward of Famagousta), in line with the south-east extreme of Famagousta fortifications, bearing S. by E. ½ E. leads to the anchorage between the line of reefs and the mainland.

Note.—Mariners are cautioned not to pass southward of the buoy. In the event of the buoy being out of position, the leading mark, or the beacon on a S.W. by W. ½ W. bearing can be safely used. *Variation,* 3¾° *W.*

64.—BLACK SEA.—*Sevastopol Harbour.—Re-Exhibition of Light on Cape Khersonese.*—The *revolving* light is re-established.

65.—BLACK SEA.—*Kertch Strait.—Cape Yenikali Light, Area of Visibility.*—The light (*flashing*) is now obscured through an arc of 59°, between the bearings N. 21¼° E. and N. 80¼ E.; and visible in all other directions. *Variation,* 1¼° *W.*

66.—AFRICA.—*East Coast.—Delagoa Bay.—Cockburn Light-Vessel, Removal in Bad Weather.*—On H.M.S. *Active* visiting Delagoa bay in November, 1878, the light-vessel was not at her station. It was also reported that on the approach of bad weather, shelter is sought for the vessel in port Melville: reliance therefore should not at such times be placed on her being in position.

Note.—This light-vessel when in position forms the only safe

mark for entering Delagoa bay at night; mariners are accordingly warned as to her probable removal in bad weather.

67.—INDIA.—*Bay of Bengal.—Bassein River.—Prohibited Anchorage near Telegraph Cables.*—To afford protection to the Telegraph cable laid between Diamond island and the north point of Bassein river entrance, two beacons (posts surmounted by boards and painted white) have been placed to mark its position; one where the cable is landed, the other inland on line of direction of the cable. Mariners are cautioned not to anchor in this vicinity except with the beacons well open of each other. If the beacons are not visible they should avoid anchoring between the following bearings of the centre of Diamond island, namely, S. by E. and S. by W. Vessels bound for Bassein should not anchor between the telegraph cable houses (one on each bank of the river, painted white), in Gnapootau reach. *Variation, 2½° E.*

68.—EASTERN ARCHIPELAGO.—*Celebes Island.—North Coast.—Shoal Coral Ground in Strait of Banka.*—Two coral shoals have been discovered lying nearly in the fairway of the strait. 1. A shoal, on which the least water found, was 3¾ fathoms, lying with the following bearings, viz.:—Cape Coffin, S. 56¾° E.; Likoepang flagstaff, S. 39¼° W.; North cape, N. 80¾° W. 2. A shoal, on which the shoalest depth obtained was 6½ fathoms, situated 9 cables north-west of the above shoal, and lying with the following bearings, viz.:—Cape Coffin, S. 54¼° E.; Likoepang flagstaff, S. 31¾° W.; North cape, N. 85¼° W.

Note.—The south point of Nain island, just open of North cape, leads northward of this shoal ground. *Variation, 1¾° E.*

69.—JAPAN.—*Goto Islands.—Kuga Channel.—Sunken Rock in Southern Entrance.*—This danger (*Keary rock*), less than 20 feet in diameter, with 3 feet over it at low water spring tides, lies with the following bearings, namely:—East extreme of Hisaka sima (Kuga sima) bearing north, distant 1½ miles; and north extreme of Isuburajima (Kosima) N. 87½° E., distance 2¼ miles. Position approximate, lat. 32° 46′ 15″ N., long. 128° 55′ E.

Note.—Tobinoko islet open of the east extreme of Hisaka sima leads eastward of Keary rock. The north extremes of Kaba sima and Isuburajima in line lead southward of Keary rock. The tides

set with considerable velocity in the vicinity of this danger; great caution should therefore be used when navigating near it. *Variation*, $3\frac{3}{4}°$ *W*.

70.—TASMANIA.—*Bass Strait.—King Island.—Intended Light at Currie Harbour.*—It is intended, early in 1879, to exhibit a light from a lighthouse now in course of erection on the south side of Currie harbour, west coast of King island. It will be a *flashing* light, elevated 150 feet above the sea, showing five flashes and eclipses alternately in a *minute*. The lighthouse, 70 feet high, constructed of iron, with central tube for staircase, is supported on 6 iron columns. Position approximate, lat. 39° 56′ 45″ S., long. 143° 51′ E. Further notice will be given.

71.—AUSTRALIA.—*New South Wales.—Temporary Light on South Solitary Island.*—Pending the establishment of a permanent light, a temporary light is now exhibited from the flagstaff on South Solitary island.

72.—AUSTRALIA.—*Queensland.—Burnett River Entrance.—Alteration in Position of Beacons and Leading Lights.*—Consequent on the extension southward of the spit on the northern side of Burnett river entrance, the beacons have been moved to the south side of the river and carry the leading lights. These kept in line bearing W.S.W. lead over the bar in the deepest water, and clear of the end of the spit; which having been passed, the leading marks in the bend of Sea reach may be steered for. *Variation*, $9\frac{1}{4}°$ *E*.

73.—AUSTRALIA.—*Queensland.—Pioneer River.—Rocky Islets.—Light on Flat-top Islet.*—The permanent light is now established. It is a *fixed white* light, elevated 174 feet above high water, and visible from seaward between the bearings N.W. and S. by W. (except where intercepted by Round-top islet between N. 58° W. and N. 64° W.), from a distance of 19 miles. A sector of *red* light is shown between the bearings N.W. and N. by E. Position, lat. 21° 10′ 20″ S., long. 149° 17′ 30″ E.

Note.—The light bearing S.S.W. leads eastward of Llewellyn shoal, Singapore rock and the foul ground extending off Shoal point, also clears the ledge off Rocky islet and the dangerous reef northward of Flat-top islet. The reef off Hay point will be

avoided by keeping within the south-west limit of the white light. Llewellyn shoal (recently discovered by Staff Commander E. P. Bedwell, conducting the Admiralty Survey, Queensland), with 3 fathoms water on it, lying N.E. of Slade point distant 6½ miles, being within the limits of the white light; it is intended shortly to show a sector of *red* light through an arc of 10°, on the western side of the sector, so that with the white light in sight, vessels will be clear of danger. *Variation*, 73¾° *E.*

74.—AUSTRALIA.—*Queensland.—Trinity Bay.—Light on Low Isles.*—The permanent light is now exhibited. It is a *revolving white* light, attaining its greatest brilliancy *every minute*, elevated 65 feet above the sea, and visible 14 miles. The lighthouse, painted white, is situated in the centre of the islet. Position, lat. 16° 23′ S., long. 145° 35′ 15″ E. The temporary light is discontinued.

75.—AUSTRALIA.—*Queensland.—Endeavour River Entrance.—Cook Harbour.—Leading Lights at Cook Town.*—Two leading lights are exhibited from above the sheds on Nos. 1 and 2 wharves. They are *fixed red* lights, and kept in line lead over the bar in the deepest water, and through the channel towards wharf No. 1. Approximate position of outer light, lat. 15° 27′ 30″ S., long. 145° 15′ E.

Note.—Vessels entering Cook harbour at night, should steer with the leading lights in line, until near wharf No. 1, when any available berth at the wharves will be seen.

76.—SOUTH AMERICA.—*West Coast.—Callao.—Lights at Landing Place and on Dock Wall.*—At the landing place they are *fixed red* lights (gas); two are placed at the right side of approach to the landing place, and one on the left side. Also a *fixed white* light is exhibited from a lantern on iron supports, situated on the dock wall head, in the Eastern part of Callao bay.

77.—SOUTH AMERICA.—*Magellan Strait.—Broad Reach.—Temporary Light at Sandy Point.*—Pending the restoration of the illuminating apparatus of the permanent lights, a temporary light is exhibited from the mole head at Sandy point; it is a *fixed green* light, visible 2 miles.

78.—WEST INDIES.—*Costa Rica.—Port Limon.—Light on Grape Cay.*—From a lighthouse recently erected on the highest part

of Grape cay, approach to Port Limon, is now shown a *fixed* light, elevated 60 feet above the sea, and visible from 6 to 8 miles. Position approximate, lat. 10° 0′ 5″ N., long. 83° 2′ 30″ W.

79.—West Indies.—*Nassau Harbour.—Hog Island Light, Arc of Visibility.*—The light (fixed) at the west end of Hog island is visible through an arc of 309°, or between the bearings N.N.E. (through east) and N.N.W. ½ W. *Variation*, 2¼° E.

80.—West Indies.—*Cay Sal Bank.—North Elbow Cay Light, Range of Visibility.*—The illuminating apparatus having been renewed, the light (fixed) on North Elbow cay, Double-headed Shot cays, should be visible 15 miles.

81.—United States.—*New Jersey.—Change of Light at Tucker's Beach.*—On and after 1st May, 1879, this light, near the entrance to Little Egg harbour, will be changed from fixed varied by white flashes, to *fixed varied by red* flashes; it will show fixed white for *one minute*, followed during the next minute by six consecutive red flashes at intervals of *ten seconds.*

82.—United States.—*Maryland.—Jane Island Lighthouse Destroyed by Ice.*—This lighthouse, at the entrance to Little Annamessex river, Tangier sound, was destroyed by the ice on the 20th January. Due notice will be given of its re-establishment.

83.—Canada.—*Gulf of St. Lawrence.—Pictou River.—Light at Pictou.*—During the summer of 1878, a light was exhibited from the tower of the new Custom-house at Pictou, bearing W. ¼ N., distant 2 miles, from the lighthouse on the south entrance point of Pictou river. It shows a *fixed white* light, elevated 60 feet above high water, and is visible 8 miles. Position, lat. 45° 40′ 50″ N., long. 62° 42′ 10″ W.

Note.—This light in line with the light on the south entrance point of Pictou river, leads through the channel seaward of the bar.

84.—Canada.—*Nova Scotia.—South-east Coast.—Liverpool Bay.—Light on Brooklyn Pier.*—In lieu of the temporary light previously shown, a permanent light is exhibited from a lighthouse at the extremity of the new portion of the pier; it is a *fixed* light, showing *white* to seaward and *green* towards the harbour, elevated

32 feet above high water, and visible 10 miles. The lighthouse, 33 feet high, is a square wooden building painted white. Position, lat. 44° 2′ 40″ N., long. 64° 41′ 30″ W.

85.—CANADA.—*Bay of Fundy.—Light on Isle Haute.*—Exhibited from a lighthouse on the summit of isle Haute, 5½ miles S.W. of cape Chignecto. It shows an *intermittent white* light, visible *forty seconds* in every *minute*, elevated about 365 feet above high water, and visible 20 miles. The lighthouse (almost hidden by trees), 53 feet high, constructed of wood and painted white, is a square tower with dwelling attached. Position, lat. 45° 14′ 55″ N., long. 65° 0′ 45″ W.

86.—CANADA.—*Bay of Fundy.—Light on Kingsport Pier.*—Exhibited from the extremity of Kingsport (Oak point) pier, west side of Cornwallis river entrance, Basin of Mines. It is a *fixed white* light, elevated 30 feet above high water, and visible between the bearings S.W. ½ W. and N.W. by W. ¾ W. from a distance of 8 miles. The lighthouse is 26 feet high; the lower part is open framework, painted brown; upper part enclosed and painted white. Position, lat. 45° 9′ 30″ N., long. 64° 21′ 45″ W.

Note.—Half-tide rock (awash at half-flood), lies S.W. by W. ¾ W. from the lighthouse, distant 8 cables. At half-tide, there is a depth of 10 feet at the pier head. *Variation*, 21½° *W.*

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, 1878.

No. 45.—AFRICA PILOT, Part II.; additional information relating to Gaboon and Congo rivers, Walfisch bay, &c.

No. 46.—WEST INDIA PILOT, Vol. I.; information relating to Magdalena river, New Granada.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, IN NOVEMBER AND DECEMBER, 1878.

1590	Adriatic:—Durazzo bay	1	0
90	Australia, north-east coast:—Middleton and Elizabeth reefs	1	6

86	Spain, south coast:—Cadiz harbour and approaches, with enlarged plan of entrance and views ...	2	6
663	Africa, east coast:—Tanga bay and approaches ...	1	6
1466	A plan of Potowmoon pass added.		
998	A plan of Patani roads added.		

Africa Pilot, Part III., or Sailing directions for the south and east coasts of Africa, from the cape of Good Hope to cape Guardafui, including the islands in Mozambique channel. 3rd edition, 1878.

Tide Tables, 1879 ... ... 1 6

Light Lists, 1879.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1878.

(*This List is completed to the 18th of each Month.*)

Claremont, s.s.; iron; built at Middlesbro', 1871; owned by Wm. Wilson, of Newcastle; tonnage, 668; Porman to Middlesbro'; iron ore; stranded near Cape St. Vincent, August 29, 1878. Inquiry held at South Shields, December 17, 1878, before Yorke, Stip. Mag.; Pickard and Ward, N.A. Master in default for not using the lead. Certificate suspended for three months; recommended for one as mate during that period.

Widdrington, s.s.; iron; built at North Shields, 1872; owned by Wm. Johnson; tonnage, 783; Cronstadt to a port in England; wheat; lost on Staur Holmen Rigg, November 4, 1878. Inquiry held at South Shields, December 19, 1878, before Yorke, Stip. Mag.; Pickard and Ward, N.A. Master in default for negligent navigation. Certificate suspended for three months.

Longhirst, s.s.; iron; built at North Shields, 1873; owned by Elliot, Lowrey & Dunford, of Newcastle; London to the Tyne; ballast; lost on the rocks at Hartley, about six miles north of Tynemouth, December 7, 1878. Inquiry held at South Shields, December 27, 1878, before Yorke, Stip. Mag.; Pickard and Ward, N.A. Master in default for negligent navigation and for not using the lead. Certificate suspended for twelve months.

328. *Kate Kellock;* iron; built at Sunderland, 1865; owned by C. W. Kellock, of Liverpool; tonnage, 1,175; San Francisco to a port in England; grain; severely damaged off Cape Horn, June 18, 1878. Inquiry held at Liverpool, January 9, 1879, before Rothery, Wreck Commissioner; Knox and Wilson, N.A. Damage occasioned by stress of weather and not by wrongful act of master, but Court held that master was guilty of negligence in having allowed his chronometers to run down, and in having given up charge of his ship to the second mate when she was in imminent danger.

330. *Red Cross;* wood; built at Miramichi, 1868; owned by William Rankin, Greenock; tonnage, 987; Quebec to Liverpool; timber; stranded in Ballinskelligs Bay, October 17, 1878. Inquiry held at Glasgow, December 10, 1878, before MacLean and Colbourn, J.P.; Nicolas and Curling, N.A. Court found both master and mate in default for throwing the anchors overboard, and in beaching the vessel instead of running for the nearest safe port. Master's certificate suspended for two years, and mate's for six months.

340. *Augusta*, s.s.; iron; built at Yarrow, 1872; owned by A. M. Cohen and others; tonnage, 567; Dantzic to Rotterdam; grain; stranded on the Kullegrunde, October 23, 1878. Inquiry held at South Shields, January 16, 1879, before Yorke, Stip. Mag.; Powell and Castle, N.A. Master absolved from blame. Mate and second mate in default for careless navigation. Certificates suspended for twelve and three months respectively.

351. *Deerfoot* and *Angelo*, s.s.; the former a composite barque; built at Sunderland, 1865; owned by J. Kelso; tonnage, 499; London to Shields; ballast. The latter built of iron at Hull, 1874; owned by Thos. Wilson and Sons, Hull; tonnage, 997; Christiansand to Hull; general cargo. In collision in the River Humber, November 17, 1878, whereby the *Deerfoot* was sunk and one life lost. Inquiry held at Hull, December 30, 1878, before Twiss, Stip. Mag.; Knox and Nicolas, N.A. Master of *Angelo* in default for proceeding up the Humber when crowded with shipping, and also for not rendering prompt assistance by lowering his boats. Certificate suspended for three months.

361. *Davaar*, s.s.; iron; built at Campbeltown, 1878; owned by M. Londen, Glasgow; tonnage, 485; Glasgow to Greenock; general cargo; lost on Paterson's Rock, Sanda, December 9, 1878. Inquiry held at Glasgow, January 10th, 1879, before Hamilton and Robertson, J.P.; Hight and Forster, N.A. Master in default for careless navigation. Certificate suspended for six months.

Leader and *Ben Ledi*, s.s.; the former a schooner built at Bideford, 1858; owned by Nicolas Bate; tonnage, 107; London to Swansea; zinc and iron ore. The latter built of iron, at Sunderland, 1873; tonnage, 1,106; owned by John Morrison and others, Shields; Newport to Venice; coals; in collision in the Channel, whereby the *Leader* was sunk and one life lost. Inquiry held at Falmouth, January 7, 1879, before Webber and Newman, J.P.; Pickard and Curling, N.A. Master of steamer not to blame. Mate of *Ben Ledi* in default for violating the 16th article of the Regulations for Preventing Collisions at Sea. Certificate cancelled.

364. *Barcelona*, s.s.; iron; built at Dundee, 1877; owned by Wm. Thomson; tonnage, 1,216; Cadiz to Montreal; fruit and wine; stranded on Dead Island, Coast of Newfoundland, October 19, 1878. Inquiry held at Liverpool, January 11, 1879, before Rothery, Wreck Commissioner; Knox and Wilson, R.N. Master to blame for stranding the vessel, but entitled to great credit for his skilful and seamanlike conduct in extricating her from a position of extreme peril. Certificate returned with a caution.

365. *Fleetwing*, barque; built at Sunderland, 1867; owned by John and James Isles; tonnage, 349; Algoa Bay to London; wool; stranded near Cape Grisnez, November 26, 1878. Inquiry held at Westminster, January 17, 1879, before Rothery, Wreck Commissioner; Pickard and Beasley, N.A. Master to blame for placing the ship in charge of an unqualified person. Certificate suspended for six months.

367. *C. S. Butler*, s.s.; iron; built at Jarrow, 1865; owned by Mr. S. Clark, London; tonnage, 760; Newcastle to London; coals; stranded on Hasboro' Sand, December 19, 1878. Inquiry held at Westminster, January 14, 1879, before Rothery, Wreck Commissioner; Pickard and Beasley, N.A. Casualty entirely due to the

wrongful acts of the master, and to his not using the lead. Certificate suspended for six months.

369. *Ibis;* wood; built at Prince Edward Island, 1875; owned by the Mersey Shipowning Company, London; tonnage, 232; Coast of Africa to England; palm oil; abandoned at sea, December 16, 1878. Inquiry held at Liverpool, January 10, 1879, before Rothery, Wreck Commissioner; Knox and Wilson, N.A. Master justified in abandoning the vessel. Certificate returned.

359. *J. E. Woodworth,* barque; built at Nova Scotia, 1868; owned by W. J. McNeill; Nova Scotia to Falkland Islands; coals; burnt at sea, November 17, 1878. Inquiry held at Liverpool, January 24, 1879, before Rothery, Wreck Commissioner; Grant and Jones, N.A. Master justified in abandoning the vessel, but should have endeavoured to flood the hold previously to doing so. Certificate returned.

106. *Charles W. Anderson,* s.s.; iron; built at Low Walker, on the Tyne, 1872; owned by Mr. H. S. Edwards and others; tonnage, 1,452; Penarth to Malta; coals; damaged by an explosion which occurred May 28, 1878. Inquiry held at Liverpool, January 22, 1879, before Rothery, Wreck Commissioner; Grant and Jones, N.A. Casualty due to want of proper means of ventilating the hold. Master not free from blame for having proceeded to sea without seeing that adequate means for ventilation were provided.

116. *Sarah Ann,* barque; owned by Messrs. Wilkinson and others; tonnage 323; Swansea to Monte Video; coals; stranded near Mumbles Head, January 7, 1879. Inquiry held at Swansea, January 30, 1879, before Fowler, Stip. Mag.; Aplin and Jones, N.A. Master in default for negligent navigation, and for going to sea with a drunken crew. Certificate suspended for twelve months. Mate reprimanded.

Official Inquiries Abroad.

Rebecca, schooner, of Sydney; lost in Broken Bay. Inquiry held at Sydney, October 13, 1878. No evidence on which to found a charge against master.

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Waldenses, ketch; Sydney; lost at Canden Haven. Inquiry held at Sydney, November 4, 1878. No evidence on which to found a charge against master.

Pomona, ketch; Sydney; lost on the bar, Manning river. Inquiry held at Sydney, November 11, 1878. No evidence on which to found a charge against master.

Waverley, brig; Sydney; grounded on the Wonga Shoal, October 30, 1878. Inquiry held November 12, 1878. Casualty caused by master keeping too close in shore.

Lochnaw, barque; Sydney; stranded at Port Adelaide, November 14, 1878. Casualty due to carelessness on part of master. Censured.

Olive Branch, barque; lost at Bimlipatam, November 5, 1878. Inquiry held there November 23, 1878. Casualty due to stress of weather. Master's certificate returned.

Qui Vive, brigantine; lost at Mayaguana, November 24, 1878. Inquiry held at Inagua Bahamas, November 28, 1878. Casualty caused by the careless navigation of master.

Queen of the South, s.s.; stranded at the entrance of the Murray River. Inquiry held November 28, 1878. Master free from blame.

Piako, ship; took fire at sea. Naval Court held at Pernambuco, December 4, 1878. Casualty due to spontaneous combustion. Master's certificate returned.

Tevere, barque; lost at East London. Inquiry held December 5, 1878. Mate to blame for negligent navigation. Certificate suspended for two years. Master also deserving of censure for not maintaining proper discipline.

Ludwig, schooner. Inquiry into cause of her having her decks swept, and loss of boat, &c., held at Port Elizabeth, December 5, 1878. Casualty caused by stress of weather.

Asphodel, barque; lost at East London. Inquiry held December 5, 1878. Mate to blame for negligent navigation. Certificate suspended for six months. Master censured.

Jalawar, barque; foundered, November 17, 1878. Naval Court held at Batavia, December 11, 1878. No blame attached to master.

Glamorgan, barque; stranded at Cape San Diego. Naval Court held at Valparaiso, December 13, 1878. Master admonished.

Kate, s.s.; stranded. Inquiry held at Hamilton, December 24, 1878. Master to blame for negligent navigation. Certificate suspended for six months. First, second, and third engineers censured for leaving the ship.

Lartington, s.s.; lost on the Coast of Bermuda, Deeember 14, 1878. Inquiry held at Hamilton, January 2, 1879. Master and mate in default for negligence and careless navigation. Certificates suspended for twelve and six months respectively.

Investigator, s.s. Naval Court held at St. Thomas, January 13, 1879, to enquire to the cause of the boiler bursting on the 8th of the same month. No blame attached to master or officers.

Compton, s.s.; stranded on St. Elmo Point, December 13, 1878. Inquiry held at Valetta, January 10, 1879. Casualty due to an error of judgment on the part of the master.

Curlew; lost on Cape Breton. Inquiry held at Bayonne. Master exonerated from blame.

GENERAL.

HEALTH OF BRITISH SEAMEN ABROAD.

British Seamen's Hospital, Constantinople,
Galata, December 31st, 1878.

The total number of patients treated at the hospital during the year 1878 was 1,221, *i.e.*, 426 indoor and 795 outdoor patients.

The total expenditure as shown in hospital books, £1,376 17s. 7¼d. In this sum are included medicines, £37 10s. 3d.; coals, £93 1s. 9d.; trousers, £27 5s. 10d.; printing, £1 2s., and medical and surgical appliances for the 795 out-patients. The number of days of subsistence for patients and household:—11,505, *i.e.*, 7,855 for patients, 3,650 for household. The total cost for subsistence alone: £645 2s. 1½d., as shown in subsistence list. The cost of subsistence alone per man per diem for patients, 1s. 7¾d.; ditto, including household, 1s. 1½d. The total cost per man per diem

for patients, only 3s. 6¼d.; ditto, including household, 2s. 4¾d. The above corresponds with the hospital accounts and books, but does not correctly represent the total cost per man per diem. The subsistence list is only to be considered correct, because the Board of Works now supplies many of the hospital goods which formerly were supplied by the hospital and entered in the books. It will be necessary for a correct statement to have the accounts and cost of the articles supplied by the Board of Public Works. The sum of £261 14s. was received from patients not British seamen, £34 16s. 11d. from the sale of medicines, and £1 7s. allowed for discount on tailors' account for trousers, which have been paid into the Treasury of Her Majesty's Consulate. The articles required for 1879 are the usual supply of medicines, &c., also needles, pins, buttons, tapes, thread, and worsted. A copy of Squire's "Companion to the British Pharmacopæia," last edition.

The general condition of the hospital is satisfactory, and Mr. Thompson of the Board of Works reports the building to be in a good state. The foul state of the public drains, after causing much anxiety, rendered it necessary to have the hospital drainage completely detached.

During the year 1878, notwithstanding the number of patients, there has been an exceptional freedom from contagious diseases; only two cases of small-pox, one in March and one in December. A few cases of dynamic typhus, some doubtful, extending over a period of a few weeks, in summer, but all acquired under purely localised conditions of a well-ascertained character, which, practically, rendered them non-contagious. There has been, also, an unusually small number of cases of intermittent fever, generally so common. On the other hand, an unusually large number of cases of pure gastric fever has been treated. A peculiar form of disease was developed on board the English steamers carrying Russian troops. It was a purely mephitic intoxication, due to the crude method of ventilation practised on board, which was almost entirely prevented by introducing a more perfect system of ventilation, and arrangement, which I suggested. I desire to call the attention of the Board of Trade to this fact, as more than half of the crews of the vessels

so employed were reduced, in a short time, to a perfectly anœmic condition of blood, all, eventually, succumbed to the mephitic influence, and many I fear will be permanently weakened in vitality. This condition was characterised by blood decomposition, and a state of general marasmus of body, with glandular, and intestinal engorgement. Several weeks elapsed before these patients could assimilate nourishment; they required much stimulant. The mortality was trifling, but few of the men were able to re-ship, and had to be sent home as convalescents, probably to become future victims of phthisis. I think it was clearly demonstrated that this condition was due to imperfect ventilation.

I regret to state again the fact of the large amount of syphilis prevailing among seamen arriving here from British ports, and the really filthy state in which men come to the hospital; and I venture to express an opinion that some simple bath arrangements should be enforced on board of steamers for purposes of personal cleanliness. The firemen and stokers as a class become ruined in health at an early age. Heart disease, glandular, and kidney diseases are quickly developed in them, and this probably is due in a great measure to the fact that the function of the skin is almost entirely suppressed under ordinary conditions of temperature. This acts as both an exciting and predisposing cause to these forms of disease. It is a rare exception to find any accommodation for personal cleanliness in steamers, where everything is at hand for the purpose. From a hygienic point of view the Mercantile Marine in this part of the world can only be considered as a large disease-producing establishment, which must eventually tell seriously upon the supply of able-bodied seaworthy men. A considerable number of grave surgical injuries has also been treated under most unfavourable conditions of vitality. The rule is, that seamen coming to this port are physically below par, and are slow to recover from either disease or injury. I think it my duty to state these facts and opinions for the information of Her Majesty's Government, with a view to future legislation on the subject, as, more or less, for twenty years my duties have brought me into close contact with seamen, and I have been struck with the marked deterioration in physique and greater

proneness to certain forms of disease, especially since the introduction of screw steamers into the Levant and Black Sea trades, and that I attribute much to the lack of means for keeping their skins clean.

(Signed) JOHN PATTERSON, M.D., &c.,
Surgeon Superintendent.

Rocket Apparatus Service.—18 Lives Saved.—Angle, 13th Jan., 1879.—The ship, *Thomas M. Reed*, of Bath, Maine, bound from San Francisco to Liverpool, stranded in Freshwater Bay, near the entrance to Milford Haven, during a dense fog, and at once began to break up. The Coastguard and Rocket Company, on receiving intelligence of the wreck, hastened to the spot with the rocket apparatus and succeeded in rescuing 18 of the crew, but two were unfortunately drowned, one in attempting to swim ashore and the other owing to an obstruction to the working of the apparatus caused by a portion of floating wreck. The rocket party all behaved admirably on the occasion, and Edward Sherlock and Ferdinando Pascoe, commissioned boatmen of the Coastguard, particularly distinguished themselves by going into the surf among dangerous rocks to render assistance.

Rocket Apparatus Service.—Ten Lives Saved.—Rhossily, 11th February, 1879.—The ship, *Mary Stenhouse*, of Liverpool, was observed on shore about a quarter of a mile from this station. The coastguard and volunteers immediately proceeded with the rocket apparatus to the assistance of the crew, and succeeded in rescuing all remaining on board by means of the apparatus, viz., nine men and one woman, wife of the steward. The rest, ten in number, including the master's wife, were unfortunately drowned in attempting to land in the ship's boat before the arrival of the rocket party. The service was of a very praiseworthy character, and reflects great credit on William Betts, the C. G. Commissioned Boatman, who was in charge of the apparatus, and also on the Volunteer Life Saving Company, who ably assisted him on the occasion.

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THE PAST, PRESENT, AND POSSIBLE FUTURE OF QUARANTINE.

WE seem to be living just now in very distinctly troublous times. There are at the present moment scarcely any quarters of the inhabited world not stricken either with plague, famine, war, or pestilence of one kind or another, and it is hard to see a satisfactory finale to the struggles now going on between life and death in various parts of the globe, as to which the British nation has a very decided and abiding interest. The heading of this article indicates pretty plainly that our topic is on this occasion a class of diseases that must exercise, from traditional, as well as from actual experience, a vast influence over the commerce and general business of these Islands, as well as the health of their inhabitants. From time immemorial the word "plague" has always, so to speak, exercised a sort of terrorism over most people, and has been associated with a sort of actual or comparative paralysis of commerce in all the districts in any way affected by it. The great outbreak of 1665 was the last occasion on which this disease did mischief in England, and from that date up to the present time we have had no cause for alarm. But yellow fever has, in various and com-

paratively recent times, and in divers manners, given much anxiety. Its home, so to speak, is in the West India Islands, and the southern parts of North America, the borderings of Central, and the north-east districts of South America. But, as is well known to most of our readers, the disease requires a high temperature for its development and continuous maintenance, and indeed, has no chance of disastrous, or fatal success, unless the thermometer reaches at least 75° Fahr. Thus we have had occasional importations of it into this country in notably hot summers, the most frequent of which have troubled Southampton (as the chief port of arrival from the West Indies), but the most consequential of which occurred at Cardiff in the year 1858, was the subject of special treatment, and a special report by the medical officer of the Privy Council, and afforded at the same time a most notable instance of intelligent sanitary supervision as contrasted with unintelligent quarantine. This, by the way, is the second disease that troubles us from time to time, but a more frequent visitor than either of the foregoing is cholera, of which we have had several well marked and practical entries, all within comparatively recent dates. It is not necessary to recapitulate the dates, or the mortality, misery and general trouble, as well as commercial derangement, associated with these outbreaks, but we may remark briefly in this place, that signs and definite symptoms were not wanting to show in each successive epidemic, an increasing amount of intelligence in the way of dealing both with the cause and the consequence, the practical results being a greatly diminished mortality, and, as we may assume, a decrease of duration of the disease. Cholera was about Europe, and within twenty-four hours steaming of our shores in 1873, and was actually imported into this country, where its subjects remained for some thirty hours. But the disease was detected, though it had penetrated to the purlieus of Whitechapel, was eliminated by the energetic exertions of Mr. Liddle, the district health officer, and the metropolis was thus undoubtedly saved from a disastrous epidemic.

These three maladies have always been classed as essentially associated with quarantine, and so when, some three or four months

ago, we were told that plague was devastating towns on the banks of the Volga, and was advancing westward, the fear of quarantine and its commercial consequences came upon us. Indeed, we may say as regards coming upon us, it did and has from the outset done so more in a sanitary than a commercial sense; for it is a curious feature in connection with the present epidemic, that those interested in shipping about the coasts of Southern Russia, the Black and Caspian Seas, the Persian Gulf, and the rivers discharging themselves into these reservoirs, have all along and to an almost incredible extent, made light of facts, fancies, and speculations that have been before us daily and weekly. Some are undoubtedly true, some are dubious, and many perhaps are false; but there can be no doubt that a sufficiency of truth exists in the news (good, bad, and indifferent) lately received, to warrant the Lord President of the Council to enforce in their strict entirety the provisions of the Quarantine Act passed in the sixth year of the reign of George IV., and which received the Royal sanction on the 27th of June, 1825. These provisions give an almost unlimited authority to do anything in the way of obstruction in order to avoid the importation of epidemic disease from foreign countries by means of the shipping; that is to say, any vessels at the present moment arriving from Caspian or Black Sea ports, on the coasts of which undoubted cases of plague are reported to have existed, can be detained bodily, with their living freight, at any moorings, and for any length of time that the Privy Council may enjoin. The trade of London and Liverpool would probably under such conditions suffer most severely, as any vessels arriving from Odessa, Kustendjie, Varna, Galatz, Ibraila, Bourgas, and many other minor ports, could be detained at the mouths of the Thames and the Mersey for a month or more, with crew and passengers on board, or relegated to any lazarette that the Council may choose (or not choose) to provide. We are compelled to this plain-speaking, because the speeches of the Duke of Richmond and Gordon in the House of Lords on this subject do not seem to be at all appreciated, or rather realized, by the commercial community in whose interests we write. The second report of the Royal Sanitary Commission, published as a Blue Book in 1871 (numbered

C 281), shows that in order to guard against the importation of dangerous epidemic disease by means of the shipping, without obstructing commercial interests, it was advisable that "ships in rivers, harbours, or any British waters, should be subjected, just as houses to the local authority of the district, and be liable to the regulations issued for the prevention of contagion, &c." With this view, when the Public Health Bill of 1872 was drafted, six clauses were specially devoted to port sanitary authorities, in which provisions are made, the effect of which is practically to treat ships as houses for general as well as special purposes, and giving powers to the Local Government Board to make any port authority a distinct district. London, and some few other places, are thus distinctly constituted, and it is to be regretted that many other port jurisdictions are not so treated, separately and independently, inasmuch as shore is very distinct from water work, and the officers of the one authority, whether chief or subordinate, are not competent to fulfil the two varieties of duties that may be thrust suddenly and indiscriminately upon them. Anyhow, the Report of the 1871 Sanitary Commission laid the foundation for a system that is, as we trust, after some important change, to supplant if not entirely ride over the old Quarantine Act of 1825.

It is well in this place to indicate as briefly as possible, what the provisions of the Public Health Act of 1872 (or more strictly the Public Health Consolidation or Amendment Act of 1875) contemplate. When cholera threatened in 1873, an Order in Council was issued that gave, under the Public Health Act of 1872, power to port sanitary authorities to detain vessels for not more than a period of 48 hours, to isolate sick, infected, or suspected cases, to let healthy persons go free, and otherwise to use all sensible means to ensure the stoppage of the disease, without any real inconvenience to commerce. These regulations were to a small extent put into operation and with entire success, and the order in Council remains valid to the present day. With this special exception (*i.e.*, with cholera) the port sanitary authorities cannot *stop* a vessel. They can board her at any point in their own jurisdiction, Customs or any other authorities notwithstanding, can remove patients suffering from infectious or contagious

diseases, and can fumigate the vessel, and disinfect, *or destroy* if necessary, any suspicious, suspected, or infected clothing. These powers are, as will be seen, very extensive, but can, as the event has proved, be exercised with much benefit to all concerned. As, however, it is with oceanic rather than coasting work that we have to do, it is as well to confine ourselves to this branch of the subject, and to remark at once how obvious is the idea that the old quarantine regulations must, if each be exercised in their entirety, inevitably clash with those of the Public Health Act. We are told in reply that the former are kept up for political reasons alone, because if some semblance of ancient quarantine was not kept up in this country, all our ships arriving in foreign ports would be quarantined as long as any suspicion of plague existed in the continents of Europe, Asia, and America. This may be, and so long as the commercial world is satisfied that quarantine exists here, and will exist here only in name, all well and good. A *façon de parler* does no harm, though to our idea it is somewhat humiliating.

Meanwhile, we may profitably glance over the means adopted by other nations in carrying out the so-called process of quarantine.

The United States have passed through a fearful ordeal during the last 18 months, and have gleaned vast and valuable experiences. It is impossible to gauge the importance of what the authorities have endeavoured to do, and have succeeded in doing, in the way of restricting the progress of the disease. But thus much has been, as we may declare, distinctly proved; that as regards yellow fever, complete isolation undoubtedly stopped the disease; but that, unless very exceptional circumstances rendered them impossible, strict sanitary precautions limited the severity as well as the number of cases; and that a reduction of temperature caused an immediate reduction in the number of cases. The result of various plans tried in the States during the last disastrous epidemic led to the conclusion that an international system of sanitary surveillance that comprises an intelligent supervision of all arrivals from all ports, is the only practical means by which the progress of epidemic disease from port to port can be prevented.

But European nations do not seem to have arrived at this stage

of reform. At the first incoherent note of alarm, Germany, Austria, Greece, Italy, and of course Spain, Portugal, and Turkey, adopted the old and absurd scheme of quarantine upon all vessels arriving from so-called suspected districts, varying from 20 to 40 days, in accordance with ancient custom. Malta, though a British garrison, and entirely under British rule, seems to have followed suit, and so, to a certain extent, British commerce has already been hampered. Egypt has evidently not quite made up its mind what to do, being probably more interested in direct financial difficulties; but long before these difficulties are ended, we may hope that the plague and its collateral complications will have passed away. There can be no doubt whatever that the disease has existed in Russia, and along the Asian border of that country for at least 18 months to two years, and that the published accounts have during that interval, been consistently and persistently garbled to a most dishonest extent. It is very much to be regretted that the Foreign Office has not, in conjunction with the Local Government Board, taken some pains to ascertain the sanitary condition of countries east of Europe, inasmuch as they connect us with India, and every year facilitates means of transport, not only as regards merchandise and persons, but as regards all other articles, including of course plague and other epidemic diseases.

It is proper to advert to the arrangements that obtain in our own Colonies as regards quarantine, and they may, as we believe, in all be summed up as antiquated, useless, and, following the Continental practice, sometimes cruel. In May of 1877, Messrs. Donald Currie & Co.'s mail steamer, *Taymouth Castle*, arrived in Table Bay, having had a case of small-pox on board during the passage, and was, with all her crew and passengers, sent off to Dassen Island to perform a quarantine of 21 days, no one being allowed to land in the interval. Messrs. Currie sent a note of the particulars to the Port Sanitary Committee of the Corporation of London, and received from them a reply, which is worthy of quotation, because it illustrates the present condition of things as regards port sanitary matters and quarantine, not only at the Cape, but in the Australian and New Zealand ports.

(COPY.)

"3 and 4, Fenchurch Street,
"London, E.C., 3rd July, 1877.

"Gentlemen,—We shall be glad if you will inform us as to what regulations are in force under the provisions of the Public Health Act, 1875, in way of dealing with vessels that arrive in the Port of London having on board, or having had on board, cases of contagious or infectious disease.

"Our mail steamer *Taymouth Castle*, which arrived at Cape Town from England on the 28th May last, had a case of small-pox on board, and under regulations in force in that Colony she was put in quarantine for twenty-one days, and no one allowed to land. We conceive that in your experience this is a very dangerous system to follow, and should be altered.

"We are, Gentlemen,
"Your obedient Servants,
(Signed) "DONALD CURRIE & Co.

"The Port Sanitary Committee
"of the Corporation of London,
"Port Sanitary Offices, Deptford, S.E."

(COPY.)

"July 4th, 1877.

"To Messrs. Donald Currie and Co.,

"Gentlemen,—I am directed by this port sanitary authority to acknowledge the receipt of your communication of the 3rd inst., asking for information as to the regulations in force under the provisions of the Public Health Act of 1875, in way of dealing with vessels that arrive in the Port of London, having on board, or having had on board, cases of contagious or infectious disease.

"In reply thereto I am to state that, under the circumstances above recited, the following steps are taken :—

"(1.) The vessel is boarded as soon as possible after she has anchored, or has come to moorings, by one of the officers of this authority.

"(2.) All persons not sick are allowed to land immediately.

"(3.) All sick persons are removed in an ambulance, or other proper conveyance, to the nearest hospital for contagious diseases, or are sent to the floating hospital maintained by this authority off Gravesend.

"(4.) The quarters, &c., of the crew and passengers (and, if necessary, the cargo) are thoroughly fumigated for eight or nine hours with sulphur and charcoal, all bedding and articles of clothing are disinfected (and if necessary, destroyed), the bunks, berths, bulkheads, and all other woodwork are then thoroughly scrubbed with carbolic acid and water, and, in most cases, re-painted.

"A sanitary clearance is then given by this port authority to the officer of Customs, the entire proceeding usually occupying about forty-eight hours.

"I am to add, for your information, that the provisions of the Public Health Act, under which this port authority is constituted, do not recognise the system of quarantine as practised in the case of the *Taymouth Castle*, for it was practically decided some years ago by the medical officer of the Privy Council and Local Government Board, and by other eminent authorities, that the prolonged detention of sick and healthy persons on an infected ship was unscientific, fraught with danger to the healthy, and often failed to isolate the disease.

"I am also to record the opinion that powers of detention for forty-eight hours appear sufficient to enable sanitary authorities to deal properly with contagious and infectious disease, other than plague, yellow fever, and cholera.

"I am, &c.,

(Signed) "HARRY LEACH, Port Medical Officer."

In Canada the rules are somewhat less stringent, and there is an evident inclination on the part of the authorities in the Dominion to subscribe to the port sanitary regulations, as foreshadowed in the clauses of the Public Health Act above referred to. But it is a matter of much regret that no distinct rules or regulations have ever emanated from the Local Government Board to guide port sanitary authorities in the execution of their sometimes very com-

plicated duties. The Corporation of London, as the sanitary authority of the Port of London, have taken the initiative in this matter, and have issued in their Reports the following code of "Qualifications" and "Duties" relating to port medical officers and sanitary inspectors, that have, as far as we are aware, been adopted by outport sanitary authorities throughout the kingdom up to the present time.

"Qualifications of Port Medical Officer.—The information to be acquired by a port medical officer of health should comprise—A thorough knowledge of the geography of the port in which he holds office, including its docks and creeks, and all outfalls, whether of sewage or otherwise, up to high-water mark. A knowledge of the general construction of the hulls of wooden and iron vessels from upper deck to keel, of the general arrangement of the crew spaces, modes of berthing, amount and quality of ventilation, arrangement of latrines, bulk-heads, ports, scuttles, wind-sails, up-casts and down-casts, state of bilges, &c. Those clauses of the Merchant Shipping Acts, and especially those of the Merchant Act of 1867, that relate to health of crews. The sanitary clauses of the Emigration Acts. The Public Health Act of 1875 and the Acts therein included, so far as they relate to port sanitary authorities. The scales of diet used commonly in coasters, ocean steam ships, and sailing vessels respectively. The average number and nationalities of vessels frequenting the port, and the sort of cargoes that they bring. The kinds and varieties of water-tanks commonly used on board ship. The sources of water-supply for inward and outward-bound vessels, how deliverd on board, and if delivered from tank-boats, the condition of the tanks in those boats. The average proportion of vessels lying in the jurisdiction that have crews living on board. A full and continuous knowledge of the weekly and quarterly bills of mortality issued by the Registrar-General of Births, Deaths, and Marriages, and of the causes of deaths of sailors who die at sea. Early information as to the presence of any special epidemic (as small-pox) in any of our own outports, or in any ports in the basins of the Mediterranean or Baltic Seas.

"Duties of Port Medical Officer.—To pay special attention

to all vessels, particularly coasting vessels, the crews of which live on board. To indicate daily, or as may be required, to the sanitary inspectors, such vessels, in order that they may be systematically visited and examined. To inquire into the water-supply of all vessels in the port, and advise as to its proper sources and stowage. To superintend the immediate removal from a vessel of any person suffering from any contagious or infectious disease, to the hospital set apart for the purpose by the sanitary authority, or if the sick person is not in a condition to be removed, to isolate the vessel. See 29th and 30th Vict., cap. 90, sec. 29. To superintend the disinfection of all clothing of seamen who have died from any contagious or infectious disease, and to grant a certificate accordingly. To inspect, under certain circumstances, before landing, all emigrants that arrive in the port from the continent for purposes of transhipment, and to isolate all suspected cases. To carry out, under the direction of the port sanitary authority, all special orders in Council relating to the prevention of cholera, or other epidemic diseases. To obtain all possible information as to, and keep a close account of, all foreign ports infected with, or suspected of, cholera, and, with the aid of the Customs' officers, to inspect all vessels as they arrive from such ports. To report to the Marine Department of the Board of Trade, without delay, any defect in cubic space for the accommodation of the crew, the existence of scurvy on board ship, or any breaches of those clauses of the Merchant Shipping Act of 1867 that relate to health of crews. To advise shipowners, with the sanction of the sanitary authority, as to any defective sanitary arrangements in their respective vessels, and to consult with them, if requested, as to remedying the same. To be ready at all times to advise shipmasters as to sanitary arrangements afloat, and specially with regard to the water-supply, the state of the bilges, &c. To examine and keep a record of all reports respecting examination of vessels handed in by the sanitary inspector, to classify and summarize the same, and to present them to the sanitary authority at each and every meeting. To attend all meetings of the sanitary authority, and present a synopsis of the work performed since the previous meeting. To

submit to the sanitary authority a yearly or half-yearly report containing a detailed account of all duties performed by the officers. To examine (if requested to do so by the crew of, or any other person living on board, any ship or vessel) any article of food that is declared to be unfit for human consumption, in order that, if necessary, the order of a Justice of the Peace may be obtained for the destruction of such article. See 26th and 27th Vict., cap. 177, sec. 26. To obtain the sanction of the sanitary authority under whom he acts before initiating any new line of action, or endeavouring to carry out any special sanitary reforms not hitherto attempted. To communicate and co-operate in all sanitary matters with the officers of Her Majesty's Customs, the Marine Department of the Board of Trade, the harbour and dock authorities, the river police, and all other authorities concerned in the official business of the port.

"Qualifications of Port Sanitary Inspector.—1. A general knowledge of ships and seamen, to which end it is desirable that he should have had some service afloat. 2. A general knowledge of the scales of diet in common use in coasting and ocean-going ships. 3. A good geographical knowledge of the port to which he is officially attached. 4. A conciliatory but decisive mode of conducting inspections, so that the abatement of nuisances or any other sanitary work required to be done by the owners or masters of the vessels may be performed without any necessity for serving a notice or applying for a summons.

"Duties of Port Sanitary Inspector.—1. To act generally, with the approval of the sanitary authority, under the directions of the medical officer of health. 2. To inspect and otherwise examine into the sanitary condition of all vessels within the jurisdiction of the port sanitary authority, in accordance with directions given daily, or from time to time, by the medical officer. 3. In pursuance of this duty, to see the officer in charge of each and every vessel inspected, and obtain from him the following particulars:—(*a*) Name of vessel; (*b*) Nationality; (*c*) Sailing, steam, or barge; (*d*) Where from; (*e*) Number of crew; (*f*) Cargo. 4. To examine the closets, heads and latrines. 5. To examine the quarters of the crews with reference to cubic space, cleanliness,

and ventilation. 6. To note the existence of any contagious or infectious disease, and to report such cases immediately to the medical officer. 7. To advise the officer in charge (if there be no medical officer attached to the ship) to send all other cases of sickness to the nearest hospital, if they can be removed without danger to life. 8. To note the existence of any foul cargoes, and to record their descriptions. 9. To call the attention of the medical officer to all sanitary defects observed during each and every inspection. 10. To direct the cleansing of all closets, forecastles, &c., in which sanitary defects exist, and to revisit such vessels to see if the directions have been carried into effect. 11. To fumigate and disinfect vessels and clothing as required, and in the manner prescribed by, the medical officer. 12. To serve 'notices' only with the sanction of the sanitary authority or the medical officer. 13. To write out at the end of each and every working day, in an official book of forms prepared for the purpose (see Appendix), an account of duties performed, and to submit the same to the medical officer for examination, in order that these reports may be laid before the sanitary authority at every meeting."

It remains for us to consider how far these and other regulations, under which local sanitary authorities have power to act, are sufficient not only for general purposes but for emergencies, such as might possibly be produced by the approach of plague.

Under ordinary circumstances no systematic inspection of the shipping is made by the officers of the port sanitary authority until the vessel is fairly at moorings, either in the river or one of the docks. Theoretically, every vessel, whether sea-going or coasting, that comes to London is supposed to be visited by a sanitary officer not later than from 12 to 24 hours after her arrival at moorings, when the questions detailed in the code above quoted are put to the officer in charge, and the replies systematically and permanently recorded. Thus, no less than an average of 14,000 craft of all descriptions are for sanitary purposes inspected in the Port of London during the year. If cases of infectious disease are found (having missed the Customs at Gravesend) they are at once removed in an ambulance to the nearest hospital,

or if discovered at Gravesend, are sent to the authority's hospital ship, moored some 200 yards below that town. In either case the clothing and bedding are either disinfected or destroyed, and the quarters occupied by the sick on board the ship in question are fumigated. This is the ordinary process that goes on systematically every day; the chief success of the system being proved by the very small amount of complaints that arise in consequence of imported cases of zymotic or indeed any other disease being "missed," *i.e.*, having escaped on shore before the sanitary authority has had an opportunity of dealing with them. But its officers have, by discreet management, secured the aid of all administrative officers connected with the work of the port, viz., the Customs, Thames police, dock superintendents, harbour masters, pier masters, and the secretaries of all the chief steamboat companies, all of whom are provided by the authority with telegram cheque books for use in cases of emergency. Without such assistance, given cordially and continuously, no sanitary staff, however large, could possibly compass the work in a port so complicated as London, where a complete round of the docks alone necessitates a walk of nearly 12 miles, that being the only possible means of locomotion in an inspection of this kind.

We shall pass over other multifarious duties, because they are not connected with the importation of disease, and so could not affect quarantine arrangements; and we must assume now for the nonce that plague is near us, and is, say, officially reported at Stettin, Hamburgh, or Rotterdam, under which circumstances it would be necessary to put in force the Order in Council of July, 1873, which was created with a view to prevent the importation of cholera. We reprint this in full, because on its proper interpretation and administration under present legislative arrangements hangs the safety of the public when we are threatened with an invasion of any special epidemic by water-way.

"To ALL URBAN, RURAL, AND PORT SANITARY AUTHORITIES;—

"To all Officers of Customs;—

"To all Masters of Ships;

"And to all others whom it may concern.

"WHEREAS the Lords of Her Majesty's Most Honourable Privy Council, by an order bearing date the 29th day of July, 1871, after reciting certain provisions of an Act passed in the sixth year of the reign of His Majesty King George the Fourth, chapter seventy-eight, and of the Sanitary Act, 1866, and further that cholera was then prevailing in certain parts of Continental Europe with which this country had communication, and that it was requisite to take precaution, as far as practicable, against the introduction, of that disease into this country, did make certain rules, orders, and regulations in respect thereof, and by certain other orders bearing date respectively the 3rd and 5th days of August, 1871, did make further regulations;

"And whereas under and by virtue of 'The Local Government Board Act, 1871,' all powers and duties vested in and imposed on Her Majesty's Most Honourable Privy Council by (among others) the said Sanitary Act, 1866, were, as regards England and Wales, transferred to and imposed on the Local Government Board;

"And whereas cholera is now prevalent in certain parts of Continental Europe with which this country has communication, and it is expedient that the said rules, orders, and regulations should be rescinded, and other rules, orders, and regulations substituted in their place:

"Now THEREFORE, We, the Local Government Board, do hereby rescind all such rules, orders, and regulations in the above-recited orders contained, except in so far as they apply to Scotland, or may apply to any proceedings now pending, and We do hereby order as follows:—

"*Definitions.*

"Art.—In this order:—

"The term 'Ship' includes vessel or boat;

"The term 'Officer of Customs,' includes any person having authority from the Commisioners of Customs;

"The term 'Master' includes the officer or person for the time being in charge or command of a ship;

"The term 'Cholera' includes choleraic diarrhœa;

"The term 'Sanitary Authority' has the same meaning as in 'The Public Health Act, 1872;'

"The term 'Clothing and Bedding' includes all clothing and bedding in actual use and worn or used by the person attacked, at the time of or during the attack of cholera.

"For the purposes of this order, every ship shall be deemed infected with cholera, in which there is or has been during the voyage or during the stay of such ship in a foreign port in the course of such voyage, any case of cholera.

"I.—*Regulations as to Customs Inspection.*

"Art. 2.—If any officer of customs, on the arrival within the limits of any port in England of any ship, ascertains from the master of such ship or otherwise, or has reason to suspect, that the ship is infected with cholera, he may detain such ship, and order the master forthwith to moor or anchor the same; and thereupon the master shall forthwith moor or anchor the ship in such position as such officer of customs shall direct.

"Art. 3.—Whilst such ship shall be so detained, no person shall leave the same.

"Art. 4.—The officer of customs detaining any ship as aforesaid, shall forthwith give notice thereof, and of the cause of such detention, to the port sanitary authority, if there be one, or otherwise, to the sanitary authority of the district within which the ship shall be detained.

"Art. 5.—Such detention by the officer of customs shall cease as soon as the said ship shall have been duly visited and examined by the proper officer of the sanitary authority or, if the ship shall upon such examination, be found to be infected with cholera, as soon as the same shall be anchored or moored in pursuance of Art. 9 of this order.

"Provided, that if the examination be not commenced within twelve hours after notice given as aforesaid, the ship shall, on the expiration of the said twelve hours, be released from detention.

"II.—*Regulations as to Sanitary Authorities.*

"Art. 6.—The port or other sanitary authority at every port shall, as speedily as practicable, with the approval of the chief officer of customs of such port, fix some place or places within the

said port where any ship may be detained, moored or anchored, for the purpose of these regulations.

"Art. 7.—Any officer appointed by such sanitary authority to see to the carrying out of this order if he have reason to believe that any ship arriving within the district of such authority, whether examined by the officer of customs or not, is infected with cholera, or shall have come from a place infected with cholera, may visit and examine such ship, for the purpose of ascertaining whether it is so infected; and the master of such ship shall suffer the same to be so visited and examined.

"Art. 8.—The sanitary authority, on notice being given to them by an officer of customs, under this order, shall forthwith cause the ship in regard to which such notice shall have been given, to be visited and examined by the medical officer of health, or some other legally qualified medical practitioner, for the purpose of ascertaining whether it is infected with cholera.

"Art. 9.—The master of every ship which is infected with cholera shall, after any such examination as aforesaid, as long as the ship is within the district of a sanitary authority, moor or anchor her in such position as from time to time the said authority shall direct.

"Art. 10.—No person shall leave any such ship until the examination hereinafter mentioned shall have been made.

"Art. 11.—The sanitary authority shall, as soon as possible after the arrival of any such ship, cause all persons on board of the same to be examined by their medical officer of health, or some other legally qualified medical practitioner, and shall permit all persons who shall not be certified by him, as hereafter mentioned, to land immediately.

"Art. 12.—Every person certified by the medical officer of health or medical practitioner making such examination, to be suffering from cholera, shall be dealt with under any rules that may have been made by the sanitary authority under the 29th section of the Sanitary Act, 1866, or, where no such rules shall have been made, shall be removed, if the condition of the patient admit of it, to some hospital or place previously apppointed for such purpose by the said authority; and no person so removed

shall leave such hospital or place until the medical officer of health of the authority, or some other legally qualified medical practitioner appointed by them, shall have certified that such person is free from the said disease.

"If any person suffering from cholera cannot be removed, the ship shall remain subject, for the purpose of this order, to the control of the medical officer of health, or some other legally qualified medical practitioner appointed by the said authority; and the infected person shall not be removed from or leave the ship, except with the consent in writing of the medical officer of health or other medical practitioner.

"Art. 13.—Such Medical officer of health or medical practitioner shall give directions and take such steps as may appear to him to be necessary, for preventing the spread of the infection, and the master of the said ship shall forthwith carry into execution such directions as shall be given to him by such officer or practitioner.

"Art. 14.—Any person certified by such medical officer of health or medical practitioner as aforesaid to be suffering from any diarrhœal or other illness which he may suspect to be cholera, may either be detained on board the ship or taken to some hospital or other previously appointed place, and detained there, for any period not exceeding two days, until it be ascertained whether the illness is or is not cholera.

"Any such person who, while so detained, shall be certified by the medical officer of health or medical practitioner to be suffering from cholera, shall be dealt with as in the above article relating to patients suffering from that disease.

"Art. 15.—In the event of any death from cholera taking place on board of such vessel while so detained, the master shall cause the dead body to be taken out to sea, and committed to the deep, properly loaded to prevent its rising.

"Art. 16.—The master shall cause the clothing and bedding of every person who may have suffered from cholera on board such vessel, or who, having at any time been on board such vessel, shall have suffered from cholera during the stay of such vessel in a foreign port, to be disinfected or (if necessary) destroyed; and if the master shall have neglected to do so before the ship arrives

in port, he shall forthwith, or upon the direction of the said authority, cause the same to be disinfected or destroyed, as the case may require; and if the said master neglect to comply with such direction within a reasonable time, the authority shall cause the same to be carried into execution.

"Art. 17.—The master shall cause every part of the ship, and every article therein, other than those last described, which may probably be infected with cholera, to be disinfected or destroyed, when required to do so by the said authority, or by their medical officer of health.

"Given under our Seal of Office, this Seventeenth day of July, in the year One thousand eight hundred and seventy-three.

"JAMES STANSFELD, President.

"John Lambert, Secretary."

"NOTICE.—The Statute 35 & 36 Vict., c. 79, provides in Section 52 that 'any person wilfully neglecting, or refusing to obey or carry out, or obstructing the execution of any rule, order, or regulation made by the Local Government Board under Section 52 of the Sanitary Act, 1866, shall be guilty of an offence punishable on summary conviction before two Justices, and be liable to a penalty not exceeding *Fifty Pounds*.'"

It will be seen that, by the terms of the foregoing Order in Council, powers are given both to Customs and local sanitary authorities, the strong feature of the arrangements being, that the latter can if they please, act throughout independently of the former. Indeed, the onus is most distinctly on them to do so if necessary, inasmuch as the responsibility of the Customs ceases when they have duly apprised the local sanitary authority of the existence of disease on board the vessel in question. The evident intention of the Order is to substitute for an irrational quarantine of promiscuous and indefinite detention, a system of medical inspection that shall afford a maximum of safety to the public and a minimum of inconvenience to the commercial community. The order is based almost entirely on evidence given at, and the resulting Report of, the Sanitary Committee, presided over by Sir Charles Adderley from 1869 and 1871, in which the inutility of quarantine, as practised by most European nations, was very clearly proved. As far as the United Kingdom is concerned, we appear in this matter to be

placed satisfactorily, if only the local sanitary authorities can be trusted to prepare their machinery properly, and to carry out the system thoroughly and intelligently, so as not to collide with the Customs, or exercise the powers given them with undue severity.

It is a pity, however, that this system of medical inspection is in no sense at present international. An International Sanitary Conference was held at Vienna in 1874, when a large majority of delegates declared themselves in favour of the scheme propounded by Dr. Seaton, medical officer of the Local Government Board, who, on this occasion, represented Great Britain, and the minority (including France) while adhering to quarantine, agreed to arrangements far less stringent than those that had hitherto obtained. And so the matter stands. We are still compelled to adopt a show of quarantine in order to avoid being quarantined by other nations, but it is incredible that the Lord President would, under any circumstances, attempt to apply the old laws in their entirety to arrivals in our own ports. "A quarantine, which is ineffective," says Mr. Simon, "is a mere irrational derangement of commerce; and a quarantine of the kind which ensures success, is more easily imagined than realised."

It is satisfactory to know that Mr. Netten Radcliffe (one of the senior medical inspectors of the Local Government Board, and the best authority on the literature and geography of plague) has great confidence in the ability of the local authorities to deal with any amount of emergency work, inasmuch as he remarked unofficially at a recent meeting of the Epidemiological Society that "the ordinary public health arrangements were quite sufficient to enable the country to deal effectually with any amount of plague, even if it should appear in this country." We trust that the events of the approaching summer and autumn will indicate the truth and justice of these remarks. Meanwhile our readers may be most emphatically assured that there is no cause whatever for alarm or apprehension, judging from the most recent date upon which a decisive opinion can be grounded.

As the author is correcting this article, the small end of the Privy Council wedge is being applied in the case of a small vessel

that arrived some few days ago in the Tyne from a Russian port laden with rags. This ship had been, as the phrase is, "repelled" from a Swedish port, and came on to England expecting free pratique at once. But the Customs authorities at Shields and Newcastle consulted the officer of the Privy Council by telegraph, the result being, that the vessel is detained and isolated until her cargo and the belongings of the crew have been fumigated and disinfected. No sickness has existed on board, and the process need not of necessity occupy more than two or three days. We presume that the local sanitary authority have nothing to do with this particular procedure, which is defensible on political grounds, but, if often repeated, would, of course, complicate commercial work to a considerable extent.

THE SHIPPING OF CANADA.

THE total quantity of shipping remaining on the registry books of the Dominion of Canada on the 31st December last, including sea-going vessels, steamers and lake craft, was 7,469 vessels, measuring 1,333,015 tons, showing an increase as compared with 1877 of 107 vessels and 22,547 tons. The year 1878 was a very unfavourable one for the shipping of Canada which suffered from the continued commercial depression which has existed for the last few years, in common with the shipping of every other maritime country, but the increase of shipping during last year over the previous year is accounted for by the fact that not a great many Canadian ships have been sold abroad during last year, the demand for wooden ships being now exceedingly limited, while the number of new ships added to the registry, viz., 339 vessels, measuring 100,873 tons, has considerably exceeded the amount of vessels lost and sold abroad.

The business of building new vessels for sale in England and other countries has been gradually reduced during the last few years, as it has been found that there was no profit in it, and

the new ships built in Canada for some time past are nearly all intended to be run on account of their Canadian owners.

The quantity of new tonnage added to the registry books in 1874, was 183,010 tons; in 1875, 151,012 tons; in 1876, 127,700 tons; in 1877, 118,985 tons; in 1878, as shown above, 100,873 tons, showing a gradual reduction in the quantity of new shipping built in Canada during the last five years. The estimated value of the new vessels added to the registry last year, including steamers, say, at 45 dols. per register ton, was 4,567,770 dols., or about £913,554. Nearly one half of the new tonnage added to the register books last year was built in Nova Scotia, which is essentially a shipbuilding country.

The quantities built in the different provinces of the Dominion were as follows:—Nova Scotia, 49,784 tons; New Brunswick, 27,368 tons; Quebec, 10,870 tons; Prince Edward Island, 10,382 tons; Ontario, 2,409 tons; British Columbia, 45 tons; and Manitoba, 15 tons.

The principal portion of the ships registered in Canada are sailing vessels, numbering 6,635, measuring 1,216,395 tons, while there are 834 steamers (many of which are of a small class) measuring 183,935 tons gross and 116,620 tons net, or register tonnage; estimating the average value of the shipping on the register books of Canada on the 31st December, 1878, at thirty dollars per register ton, including steamers, it will give the sum of 39,990,450 dols., or about £7,998,090 sterling as the value of Canadian shipping.

There are 81 ports of registry in the Dominion, many of them being small ports which have been established for the convenience of shipowners who are generally desirous to have a registry port near hand at which they can register their vessels. The principal registry port in Canada is St. John, New Brunswick, at which port there are registered 755 vessels, measuring 276,016 tons, and it is probable there are not more than three or four ports in the British Dominions which have on their registry books a larger tonnage than this, viz., at London, Liverpool, and Glasgow. A number of large steamers registered at Glasgow and Liverpool are engaged in the Canadian trade and are partly owned in this

country although not appearing on its registry books. Of the total tonnage registered in Canada, Nova Scotia has the largest quantity, viz., 553,368 tons; New Brunswick, 335,965 tons; Quebec, 248,349 tons; Ontario, 135,440 tons; Prince Edward Island, 54,250 tons; British Columbia, 4,482 tons; and Manitoba, 1,161 tons.

Nearly all the tonnage registered in New Brunswick and Nova Scotia is sea-going and usually employed in the foreign carrying trade; and many of the vessels above 500 tons are engaged in the carrying trade of Europe. Nearly every Canadian vessel engaged in the foreign carrying trade is classed either in British Lloyd's, French Bureau Veritas, or some of the United States' Institutions. Many of the sailing vessels and steamers registered in Ontario are large vessels engaged in the carrying trade on our inland seas or lakes, and are generally classed or graded in the Lake Association of Underwriters.

As compared with the shipping registered in other countries, Canada appears to take the fourth rank in point of importance. The "*Reportoire General*" for 1878 and 1879 gives the sea-going tonnage and tonnage of steamers over 100 tons of some of the Maritime States as follows:—United Kingdom, including her Colonies, 7,860,692 tons; United States of America, 2,484,418 tons; Norway, 1,413,503 tons; Germany, 1,087,606 tons; Italy, 1,019,137 tons. Canada, with her 1,333,015 tons, will therefore appear as the fourth maritime country in the world, and will take precedence over Germany, Italy, France, Russia, and other countries of Europe, except Norway, which stands third on the list.

The casualties to British, Canadian, and foreign sea-going vessels, officially reported as having occurred in Canadian waters and to Canadian sea-going vessels in waters other than those of Canada during the year ending 31st December, 1878, were 310, representing a tonnage of 129,143 tons register, and the amount of loss upon them, total and partial, so far as ascertained, was 2,770,000 dollars, and the number of lives lost in connection with these disasters was 116, namely, 13 in Canadian waters, and 103 in waters other than those of Canada.

The disasters officially reported to the department as having occurred to vessels on the inland waters of Canada, during last year, were 29, representing 5,497 tons register. The amount of loss sustained is estimated at 131,375 dols., and the number of lives reported lost was 5.

The total number of casualties, officially reported as having occurred, during last year, to sea-going and inland vessels, was 339, and 129 lives were reported lost in connection with them. The aggregate number of tons involved in these disasters was 134,640 tons register, and the total amount of loss, so far as has been ascertained, including both vessels and cargoes, was 2,901,375 dols. This amount includes the damage to and loss of cargoes, as well as damage to and loss of vessels.

WM. SMITH,
Deputy Minister of Marine.

Ottawa, 17th February, 1879.

ADMEASUREMENT OF TONNAGE.

THE recent reprint of an article from the *Nautical Magazine*, on "Admeasurement of Tonnage," will doubtless be read with great interest by all who are connected with shipping, and by all who are fond of historical research.

The writer is evidently of opinion that steamers are too highly favoured by the existing laws, and would recommend that the large spaces which are now exempted from dock dues, and similar charges, should pay their quota to the state. These privileges were established when steam was in its infancy, when an Atlantic passage required a steamer to practically fill herself with coals, and when it would have been impossible for unsubsidized lines to run. Modern improvements of form of hull, boilers and machinery have now rendered mail subsidies almost a thing of the past; but there are grave reasons for believing that any additional imposts on steamers would annihilate their trade on remote voyages, retard the progress

of the great Australian Colonies, and divert a portion of the carrying trade into other channels. Of course, in the long run, the loss, which, at the outset, would fall solely on steamship owners, must ultimately be borne by the whole community; but before the change could be adjusted, it is probable that incalculable mischief would result, and a coasting steam trade, which is daily increasing in tonnage, be compromised. Rapid locomotion has now, by land or sea, become one of the necessities of life, and the margin of profit of steamers is so small in excess of that earned by sailing ships, that additional imposts would end in disaster. For example, if the books of the magnificent steam lines running to the Pacific, the United States and elsewhere, were laid before the public, it would be found that many had not been earning sufficient to cover the working expenses and depreciation. It was distressing to walk round the Great Float at Birkenhead and mark the number of steamers laying idle—steamers of which the foremost maritime people in the world might justly be proud. He will be a bold man who will rise in his place in Parliament and propose that additional imposts shall be placed on this class of vessel.

It is certain that whatever concessions are made by the Legislature, advantage will be taken to overstep them by the cunning. To take a single case as an example, the coamings of hatchways were raised so far above the deck, that a large percentage of the tonnage escaped contributions in every form. This has now been remedied by adding to the register tonnage the space in excess of a half per cent. on the net tonnage. In the grain trade, both at home and abroad, the structures erected were often so glaringly disproportionate as to fully warrant the Legislature to interfere as they did. The law is always possessed of sufficient power to check any gross departure from the dictates of common sense, and it would be undignified to haggle over trifling infringements, which, in many instances, arise more from accident than design.

On the Atlantic in winter, with a heavy cargo on board, the spar-deck ship is absolutely the only one which is calculated to do battle successfully with the heavy seas which then roll home to the west coast of Ireland. The managers of the Cunard Line, with

their usual sagacity, appeared to have foreseen that at no remote period they would have to meet rival lines on equal terms, and that the system of deck-houses, while equal to the duties for light drafts in passenger ships, would fail to be remunerative when it became necessary that the carriage of dead weight must form one of the most important elements of profit. And so all the modern steamers of their well-known line have been covered in from stem to stern, and in such cases no room is left for a dispute on the question of tonnage.

In coasting steamers, especially on board of those engaged in the cattle trade between the United Kingdom and Ireland, a most liberal allowance is made to the owner, and it is a question for consideration whether their freight-earning places under the turtle back and bridge deck should not pay on a certain portion of the space. For the particular service for which they are constructed they are preferred by cattle dealers to the hold or 'tween-deck, having air, light, and shelter, while the other compartments below certainly, in some degree, fail in the first two. Again, these places are often filled with empty porter barrels, or crates of vegetables. The latter would deteriorate if exposed to sea or rain, or to the vitiated atmosphere of the 'tween-decks; under the turtle back or bridge they are secure from any pernicious influence, and reach the English or Scotch markets in almost pristine freshness. Such a privilege concedes great advantages to particular classes of steamers by enabling them to utilize a deck which pays neither light nor tonnage dues, and to dispense with equipments which practically similar vessels are bound by law to provide.

These remarks are not written with a view to call the attention of the Board of Trade to this or any particular class of ship, but to indicate the difficulties which must arise if hard and fast rules are introduced by the Legislature. Doubtless, all things being considered, the public gain more than the shipowner by the above privilege, for in addition to the advantages enumerated from partial covering in, the deck passengers have ample shelter from the weather, safety is insured, and with cattle on board the upper deck hatches are seldom or ever closed. In a reasonable

manner legislators are, in an exclusively maritime country, bound to look somewhat in advance of the passing moment, if they wish to avoid confusion or even disaster in an emergency, and the humble boats of the cattle trade could, on short notice, be converted into safe and useful transports, though they may in times of peace evade a trifle of tonnage or light dues. Quite recently the scare of war compelled the Admiralty to seek in the fleet steamers of the Merchant Navy the means of protecting a commerce which their own fighting ships were quite unequal to undertake, and on more than one occasion there have been advocates within and without the walls of the House of Commons who strenuously sought to subsidize the Cunard and other ocean lines, in order that their services might, at the outbreak of a war, be at once utilized. The practical difficulties in the way of such a scheme need not be dwelt on, suffice it to say that the ablest shipowners of the United Kingdom have pronounced it a fallacy. For example, steamers, which only ten years since would, in an emergency, have commanded their own terms, are now almost obsolete if they have not been compounded, and even when this economical improvement has been carried out their proportions fail to realise the high rate of speed and economy of fuel which mark the construction of others recently launched. Foremost amongst these are the magnificent steamers of the White Star Line, the creation of the genius of Messrs. Harland and Wolff, and of the Inman line. Until they proved in what time the Atlantic could be bridged, men were content to dwell on what was considered the marvellous speed of a few of the modern ships of the Cunard Line, and to such a pitch was this carried in many of the remote States of the Union that to have crossed in the *Russia* or the *Scotia* was a species of introduction into American Society. That great company to whom the public owes so much are now compelled to descend into the arena of competition on equal terms with their once despised rivals, and will doubtless in the future design their new Atlantic liners by standing on the shoulders of the giant, who, amidst difficulties of no ordinary kind, has never lost faith in his own powers. It is such men that build up empires, although not unfrequently the greatest of their contemporaries fail to do them

justice, and the envious seek to decry that merit which in their littleness they cannot appreciate.

Crew Space.—The opening paragraph on this important subject so strongly reminds us of the accommodation for the crew of the first ship we went to sea in that we are induced to copy it *in extenso* and briefly sketch our own experience of a crew space of the good old times of whose glories we hear so much since the dust of nearly forty years has accumulated on their remains.

"'*Crew Spaces.*—A forecastle occupied by seaman is a place not fit to keep a dog in. It is so constructed that the sea can find its way in through the hawse holes, or through the sides, or through the decks, and distribute itself over the floor and trickle over and saturate the bedding; it is constantly filthy from dirt and vermin. No adequate ventilation is provided,—it receives insufferable stenches from the bilge water, the cargo, and the privies and urinals,—it sometimes contains men who are suffering from loathsome and contagious complaints; what little clear room it contains is taken up by ship's stores, and yet the crew are expected to live in it, to be cheerful, to be fit for work, and to be healthy, whatever may be the climate, whatever may be the weather.'

"This is the substance of complaints frequently made in past years by seamen and by philanthropic gentlemen on their behalf."

The ship was one of that class which sailors of the old school in their remote country homes, when the rail or even the mail coach had not yet penetrated, still alluded to as free traders. She was 658 tons register. Her crew before the mast consisted of twelve able seamen and ten apprentices, all of the latter were the sons of gentlemen. The father of one was an alderman of the City of London, another was the son of a distinguished military officer, two were the sons of lawyers in good practice in the City, another the son of a physician, two the sons of a wealthy farmer and millowner in Kent, and the remainder were also well connected. The small top-gallant forecastle was divided longitudinally amidships by the bowsprit, two upper bunks, and one water cask. The seamen possessed the whole of the port side, but a very large galley sufficient for the cooking of forty cuddy passengers, any

number of invalid soldiers, and the ship's company, was cut off by bulkheads or gratings from the apprentices on the starboard side. On the fore side of the galley, but in the forecastle, was a fair sized scuttle capable of taking a cask of beef end on, which led into the fore peak through another scuttle. In the 'tween deck portion of this space, the spare sails, ropes, blocks, and cargo gear were stowed, and below the salt provisions, coals, tar, varnishes, &c. The last were in tanks on the old-fashioned wood breast hooks, and to this day we marvel that that ship was never set on fire in drawing off their contents; possibly the flame of the lamps, which were trimmed with cook's slush, had not sufficient power to throw off danger sparks. Be it as it may, she attained an honourable old age, and her name has not long disappeared from the Mercantile Navy List. The result of these arrangements was, that every item required by the boatswain or cook had to be passed through the forecastle. At the commencement of the voyage, a part of the duties of the apprentices was to fill the galley coal-box in their watch below, on every Saturday afternoon. It would appear that this had long been deemed a grievance, and after divers secret meetings between the respective watches, an agreement was entered into to positively decline the task at all costs. The result is of no importance to the object of this desultory paper, suffice it is to add that the custom was broken down for ever, and Malay Bob and his assistant henceforth managed as they liked.

The windlass was immediately abaft the forecastle bulkhead, the upper part of which was hung on hinges to give the cable free play, and the pawl bitt within. Across the centre part of the head of the top-gallant forecastle was a pin-rack, with the lower ends of the pins extending some nine inches below the beam, and, owing to the position of the galley, the only entrance was between this *chevaux de frise* and the body of the windlass. By constant practice, the athletic among us were enabled to place one hand on the "norman" and spring through this opening feet foremost on to the first chest within. It has already been stated that there were two bunks amidships. Around that part of the bow not appropriated by the galley were six more, and the remaining two apprentices

slept in hammocks. Of course, in bad weather these hammocks were generally hung up, and with the ten chests, covered so much of the floor space that it was not possible to move from one part to another without crawling over the lids. As the tropics were neared, numberless cockroaches, who had during the winter been hibernating in the many chinks and seams around the galley, started into renewed life and claimed their share of the premises. A far greater nuisance, however, was the various offensive smells from the galley, notably when coffee was being roasted, or if Malay Bob slily shook a pinch of cayenne pepper on the hot stove plate. When this occurred, it was marvellous to note the agility displayed in clearing the windlass at a single bound. There were no side or deck lights, but in fine weather the cap-scuttle on the top-gallant forecastle, placed for the convenience of striking stores below, was removed, and reading or working was carried on by sitting near it or close aft, near the pawl bitt.

The cathead passed through the extreme fore part of our own particular bunk, and formed a natural pillow of sound African oak. Further aft were the stanchions, to which the standing parts of the jib and staysail sheets were secured, and when working down channel in November, with the anchors over the bows, the amount of ingenuity displayed in dunnaging the bed would not have done discredit to a stevedore of New York longshore men.

It is not necessary to dwell at this particular juncture on the discomforts of water pouring through the hawse, nor of the fashion in which our chest lid flew off when the anchor was let go in Funchal Roads, nor of the big score made in the end by the cable as it rattled through the hawse. The old chest is still intact, and the "elum" patch inserted by old Charley, the carpenter, often re-calls an event in a not unadventurous career. Homeward, a great number of bales of cinnamon were taken on board at Colombo, and, for want of space, a few were stowed in the fore-peak. It was mid-winter at the Cape, and a certain number of passengers offering for the Isle of France, the captain determined to touch there and fill up. On leaving Port Louis, owing to the proximity of the land, the cables were unbent, and the water being smooth, no notice was taken of them as night came on. The

captain having given his orders for the night, went below, and unless very bad weather was expected, no one troubled him till daylight.

It was the chief officer's middle watch. He was a splendid sailor, a great favourite with the passengers, a great favourite with the seamen, and almost worshipped by the apprentices. Unfortunately, however, he, like many of his profession of the period, was too fond of his glass of grog; and in fine weather, after placing an apprentice on the look-out, would sit on a hencoop, with his back against the main topsail brace, and sleep soundly. On clearing the island the wind freshened fast, and water commenced to pour in through the hawse holes, the whole running over to the apprentices' side of the forecastle, owing to the strong inclination of the ship to starboard. The senior sent an apprentice aft to inform the mate of the state of things, and as that produced no effect, ultimately went himself; but all the reply that he could get was, "Nonsense, my boy, don't disturb my snooze; put your leg in for half-an-hour, and I will come and relieve you." During his absence the scupper of the bulkhead became choked, and the water quickly rose until it passed over the opening leading into the galley. Chests were floating wildly about; and one youngster, after tossing his traps into an upper berth, jumped into his and made all hands, amidst their discomfort, laugh by shouting "Sculler, sculler." At last the slight bulkhead between the galley and the forecastle gave way, and the torrent rushing through the door bore Malay Bob and the major part of his saucepans along the lee side of the deck to the poop ladder, near which many were found when morning dawned.

The next day there was a stormy investigation, but no one peached on the mate, and all chuckled as the drenched bales of cinnamon were spread out to dry by the side of our own ruined clothes. This was in no sense an extreme case. Officers who are old enough to remember what crew spaces were before the Legislature interfered, will fully bear out the assumption of the unknown correspondent quoted above.

It may not be deemed sentimental to quote one or two more instances from the incidents of this voyage, for they indicate that legislation did not interfere too early between the owner and

the seaman. At Port Louis it was remarked that a great number of the well-known casks of salt beef and pork were landed, and also that a lot of well-coopered barrels came in lieu. This exchange excited some remark, as a large body of invalid soldiers had come on board, and men wondered, where so many mouths had to be fed, why the provisions were landed. The next day the mystery was cleared up. One of the new barrels had been opened and served out alike to troops and sailors, and the sergeant-major had, with the non-commissioned officers, carried that portion belonging to the former on the quarter-deck, and the officer in command had, by the advice of the regimental surgeon, condemned it as unfit for human food. The men marched to the lee-gangway, emptied their kids into the sea, and a cask of prime mess beef was opened for their use. But now came forth a singular order. It was that in order to consume this refuse, sailors and apprentices were to have it served out to them five days a-week. Of course there was grumbling in the forecastle, but nothing more, and during these five days weekly, until the ship reached England, we lived on a little rice and biscuit. The meat was never brought from the galley, and after supper Malay Bob used to throw the leathery, grisly slabs into the coppers and boil the small modicum of fat from them. The passage home was unusually long and stormy, and all hands suffered in some degree, but none so much as an old man-of-war's man named James Wilson. He had served with the writer's father at Copenhagen, and subsequently they were in various skirmishes together in the war with the United States, in 1813. On the return of the *Mars* to England, her crew, with many others, were turned adrift to starve or live as they best could. Wilson often used to state that many of his old shipmates died from sheer want, and that he had often slept under a hedge without knowing where he was to breakfast. The old warrior never complained, and would look with quiet scorn on his less punctilious shipmates when they made a rush at the cuddy "dog basket." But we all saw that he was failing, and his rude messmates tried, on more than one occasion, to induce him to lay up. It made him angry, and seeing it unavailing the men ceased to trouble him. When the ship was moored in the West India Dock, Jem went on shore,

and on paying off came down in a cab. Keen observers noticed that he was flushed and excited, but no one said a word. When his name was called, he marched up to the table, and looking steadily at the captain, said, "That money has come too late to save Jem Wilson. You, with your meanness and robbery, have squeezed out the little of life which was left," and then turning to me, "When you see your father, tell him the merchant service, as it now is, is no place for you, and that Jem Wilson has gone to the *Dreadnought* to die." His remark was prophetic, and if the death-roll of the period were searched, on its pages would be found the name of my former shipmate classed with the unknown dead.

On the return of my father from foreign service I mentioned Wilson's name, and he related the following incident of the march to Washington. They were much harassed by the American riflemen, who being familiar with every part of the country, kept an incessant skirmishing with the advanced guard. A bullet grazed Wilson's head, and although he saw a slight puff of smoke in a tree hard by, the man who had fired was not to be seen. He turned away, but his enemy in attempting to reload struck a decayed twig and betrayed his position. A shot, a shriek of agony, and then a man rolled off the branch which had once so effectually concealed him. In doing this his foot caught under the limb above, and he hung head downwards. In the hurry of battle there was no time to release him, and on the return from Washington his body, covered with clotted blood, was observed in the same position.

Another incident of a similar nature is yet fresh in our memory. The N.E. trade wind had died away during the night, and the long northwest swell indicated that the ship was nearing the region of westerly gales. At daylight the man at the head pump called out "sail ho," and shortly afterwards, "boat close to." The bulwarks were high, and the watch on deck ran on the forecastle to look at her. In a few minutes a voice called out, "heave us a rope." "Aye, aye. All ready. Look out there," and a light line was flung into the bows. We noticed that the crew looked worn, and then learned that the ship had been purposely run by

St. Helena and Ascension, and that for many days they had been living on paddy and water; no tea, no coffee, nor sugar. They were supplied with a cask of our precious St. Louis cheek, a bag of biscuits, and a can of coffee, and left in high spirits with their prize. The name of that ship and her master are still remembered, but as it is not impossible that he may still be alive, it is wise to conceal it for the present. Strangely enough, after nearly forty years we fancied we heard the name in Liverpool. Two days afterwards a brig hoisted a signal of distress and a request for a surgeon. On going on board we learned that she was from the Benin and Cameron Rivers. In crossing the bow of the latter she had struck heavily, sprung a leak, and a stream of clear water issued from the scuppers indicated the labour the crew must have had to keep her afloat. But they were faithful to their trust and ultimately reached Liverpool in safety. On board were several invalided seamen, and it was to procure a supply of medicines and medical comforts that the signal was made. These were freely supplied from the military stores, prescriptions made up, and with many expressions of gratitude the doctor was conducted over the side. He expressed his surprise that a vessel whose medicine chest originally contained only a few of the coarsest drugs should have been permitted to embark men whose lives depended on care and good nourishment.

The law has long since rendered such acts as the above impossible, and the tide sets in from the opposite direction. Too often seamen, when they ship on their own terms, fail to remember that there is a second party to the contract, and the condition in which many keep their crew-space is almost incredible. On paying off it is often strewed with broken bunk boards, filthy straw, and not unfrequently a broken stove, as if their successors and their employers were enemies to whom no quarter was to be shown, enemies who where to be mulcted and annoyed directly and indirectly. The fact cannot be gainsaid that no class of men are, as a rule, more indifferent to one another's sufferings than merchant seamen. A sick man is looked on as a public enemy, an impostor in fact, who shipped under false pretences, and to whom no quarter is to be shown.

NOMENCLATURE OF DECKS.—The author's remarks on this subject are as worthy of attention now as they were when written seven years since. These, who have spent the major portion of their lives on ships, often, as they step on the deck of a modern steamer, feel like a blind man being led across a crowded thoroughfare by a kindly guide. He hears sounds of whose meaning he is perfectly unacquainted, or at least can only make a rough guess at them, and to make it more unintelligible still the officers of the ship are not agreed amongst themselves on the question. What is the difference between a spar deck, a main deck, and an upper deck? What is the difference between a hurricane deck, an awning deck, and a promenade deck? Of course, every one has privately a right to christen the decks of his own particular ship by any names he deems fit, just as the house builder has to attach high sounding names to his scamped and flimsy structures. But officially it would certainly be advantageous to all parties to have a standing name for each deck. Possibly it might even be judiciously extended further, for there is now a great deal of mystification in describing a ship from the use of so many terms in speaking of one part; for example, skin, ceiling, lining, mean the same thing. There is need of the revision of a second Beaufort in all these points, but we are a free nation and despise or delay the introduction of new-fangled ideas as long as practicable, and too often affect to believe that we are still superior in all that makes a nation great and prosperous.

The author gives quotations from the speeches or writings of the owners of sailing ships who complain that too many privileges are accorded to steamers. But it has already been shown that however great they may be they are not sufficient, in many instances, to enable them to pay the smallest dividend. The legislators of the past generation wisely foresaw that the necessities of the age would soon demand greater carrying powers than could possibly be supplied by sailing ships, and most wisely endeavoured to foster a source of power which alone enables England to hold the lion's share of the carrying trade of the world. But for steam the mercantile navies of Canada, the United States and Norway would now be well abreast, owing to an unlimited

command of material, and in one if not two instances cheaper labour.

Doubtless the privileges which have been given to steamers are occasionally abused, and a few highly favoured command an extraordinary exemption, yet even where this is the case, it is evident that the public largely share the advantage conferred by securing rapid transit for passengers and letters. It is believed that if the country were polled that no disinterested person would attempt to impose an additional burthen on the boats which have for so many years successfully plied between Kingstown and Holyhead. Other lines are doing their work equally well, but there are none with whose names the travelling public are so familiar, and a fatal accident to one would be looked on as a national calamity.

Sailing ships must henceforth be content to hold a secondary rank in the shipping community, and no legislation can alter the inevitable. Merchant seamen of the old school will regret the change, as naval officers still do the introduction of ironclads; but however much it may be deplored, the laws of progress must not be tampered with. Science is revolutionizing alike the arts of war and peace, and it can only be effected by injuring individuals in a greater or less degree. A far more serious injury to trade exists in the unhappy strikes which have often, in particular trades, wrought more havoc than a famine. Up to the present time all reasoning has been thrown away on the unreasoning masses, and when beaten, so far from learning wisdom by the result, they sullenly await a time to renew the hopeless struggle. In the days of inflation strikes are excellent institutions for obtaining a fair share of the large profits; but when applied to the ordinary principles of commerce, fail hopelessly. There are signs that in order to maintain commercial supremacy labour will have to abate its demands, and in some measure at least allow masters to be the best judges of their own affairs.

IRON AND STEEL ARMOUR PLATES.

THE contest between guns and armour has now been going on for more than twenty years, and the ultimate result appears to be as far off as ever. While in place of the old 68-pounder we now have monster guns weighing 80 and 100 tons, and throwing a shot of nearly a ton weight, the thickness of armour has increased from 4½ inches in the *Warrior* to two feet in the *Inflexible*. It is doubtful if the limit of thickness of armour has even yet been reached; the limit of size in the gun certainly has not. Still it must be remembered that although we may expect to hear of much larger guns than any at present in existence, the difficulty and danger of fighting these monsters on shipboard will be very great, as has been recently forcibly exemplified by the unfortunate accident on board the *Thunderer*. It is confidently expected on the other hand that something may be gained on the armour side of the question by the adoption of some material for armour plates which shall offer more resistance to shot than the rolled wrought-iron plates hitherto used. In an article some time ago,* we described the processes of armour plate manufacture and the construction of the armoured sides of modern ironclads, since that time the material used for armour has continued to be soft puddled iron, and no very great change has taken place in the arrangements of the iron frames and skins, and wood backing which form the "protected side" of an ironclad. Thus in the French ship *Devastation*, which is the most heavily armoured full-rigged ironclad, the side consists of an inner skin 1½ inch thick, outside which comes teak backing of 12½ inches, consisting of logs running in a fore and aft direction, and then 15 inch armour plates. The Italian *Dandolo* and *Duilio*, which have thicker single plates than any other vessels, have an inner 1½ inch iron skin, backing 17½ inches thick, consisting of

* *Nautical Magazine*, 1873, p. 814.

teak logs placed vertically, and having vertical iron frames between them at intervals, the armour plate outside this being 21½ inches thick. The English *Inflexible* has a side made up of an inner 1½ inch iron skin, backing 6 inches thick, made up of teak plank placed fore and aft, with iron stringers between them at intervals, then armour plates 12 inches thick, then a backing or rather a cushion of teak 10½ inches, consisting of logs placed vertically, and an outer armour plate 12 inches thick. The *Inflexible* is the first instance of the employment of two thicknesses of armour with wood between them on the armoured side of the ship, but the *sandwich* system, as it has been called, has been followed in several cases in the construction of turrets, in the English ships *Devastation*, *Thunderer*, and *Dreadnought*, and also in the Russian *Peter the Great*. We believe this has resulted from the practical difficulty of bending the very thick armour to the extreme shapes which are required for turret armour, or perhaps we should rather say to the difficulty of bending it without injury. The Italian Government however have even the turret armour of the *Dandolo* in single plates nearly 18 inches thick.

While thus armour has been increased from 4½ inches to 24 inches, the same material has been used throughout. The quality of that material is much better than in the early days of armour plate trials, as is exemplified by the fact that, in the early Shoeburyness experiments, the plates were very liable to crack through the armour bolt holes, so much so that many devices were tried with a view to securing the plates in such a way as not to require holes through the armour. The quality of the armour has been so far improved, however, that for some years past the holes for armour bolts have ceased to be seriously objectionable.

Within the last few years, several proposals have been put forward for introducing new material for armour plates. We will not spend much space in noticing one of the first, which, indeed, had more especial reference to armour used in land defences than on ships. It is ably described in a paper read before the Institution of Naval Architects, in 1877, by Commander H. H. Grenfell, R.N., and is due to Herr Grüson, of Magdeburg, in Germany. It is, to use cast-iron of superior quality for armour

plates, and to cast them in chill moulds. "These iron moulds," it is said, "chill the surface of the plate and give it great hardness and elasticity. When sufficient metal to form the plate has been poured in, molten metal is run round the mould itself. By these means, whilst the surface of the plate is chilled by contact with the mould, the interior is prevented from cooling too rapidly, and the particles of iron have time to assume their natural positions, with the result that the interior and inner side of the plate retain the high degree of tensile strength which belongs to the iron used." Wrought-iron plates are partly penetrated by shots which cannot get through them, and thus would be liable to be destroyed by a continuous fire from guns of comparatively small calibre. The advocates of chilled cast-iron armour believe that it would be absolutely impregnable, as regards guns of less calibre than those capable of penetrating it. It is, however, admitted that a thicker plate would be required than in the case of wrought-iron to resist complete penetration by any given gun, and for this reason alone it appears altogether improbable that it will ever be used for ships' armour plates. It is true it would cost much less than wrought-iron; but the great consideration in ironclads is weight, and the armour which is really the cheapest in the end is that which, weight for weight, is the most effective. This is due to the fact that greater weight of armour necessitates larger displacement, and this requires a larger *area* of armour, more powerful engines, &c., which again further increase displacement, and so every additional ton of armour tells much more in the total expense of the structure than in its own prime cost. Herr Grüson's cast-iron armour was tested by shot from some of the Krupp guns, and although it was reported to be a success, the German Government do not appear to think very much of it, seeing that they have used ordinary rolled plates, even on land defences constructed since the trials. Cast-iron armour was also tried at Spezzia, in the notable series of experiments made by the Italian Government, in November, 1876, but the results were not at all satisfactory.

The proposal to adopt cast-iron as the material for armour plates, although it led to no immediate result, served to direct attention

to the question of the defects of wrought-iron, and also to the consideration of means for avoiding them, without at the same time sacrificing the well-known advantages of the old material. The adoption of mild steel in place of puddled iron for the frames and skin plating of war vessels has also served to bring about trials of new materials for armour. These trials are described at length in an able paper recently read before the Institution of Mechanical Engineers, by Captain C. O. Browne, R.A., of Woolwich, and entitled, "On the Construction of Armour to resist Shot and Shell." Captain Browne's paper gives an admirable resumé of the present state of the armour question, and he describes the more important experiments in England upon wrought-iron armour of the last few years, as well as the Spezzia experiments upon steel armour plates, and some more recent trials of composite iron and steel armour. First he compares the action of different kinds of guns and projectiles upon armour. The first large guns which were used in his country, and those which were for a long time after favoured in America, were designed to throw a large shot with low velocity. Their action upon armour was to break it up, and this method was successful with the inferior plates at first tried. We remember seeing the effect of a large gun known as the Horsfall gun, at Shoeburyness, upon a target representing the side of the *Warrior;* a breach was made in the target, but it was a smash such as suggested a waste of force. As better wrought-iron armour was produced of greater thickness it was seen that the best method was to pierce or punch rather than smash the plate, and for this purpose the present style of heavy gun throwing a comparatively small shot with great volocity has obtained. The first projectiles, and those best adapted for smashing, were spherical. Flat-headed cylindrical shot were then tried, and they are most effective merely for punching a hole in a plate, but a cylindrical shot with an ogival head has been found most effective in penetrating the ordinary armour and backing. The flat-headed shot punches a hole through the plate and cuts out a disc from it which meets with great resistance in the wood backing. The pointed shot on the contrary punches a hole, but instead of tearing out a disc cleaves the plate and passes through it, and then through the wood backing. This projectile

finds out especially the peculiar weakness of the *sandwich* system, and Captain Inglis states on this point as the result of experiment that the resistances of armour 7½ inches thick made up by one, two, or three plates, varies respectively as 100, 96, and 89; and that a single plate 17½ inches thick is about equal to three 6½ inch plates separated by 5 inch layers of teak. If such be the case, the English *Inflexible* with two 12-inch armour plates must be superior to the Italian *Dandolo* with one plate 21½ inches thick; but there is a farther consideration, it is exceedingly difficult to make reliable armour plates of the greater thickness, unless they be narrow, and one result of the Spezzia experiments was to prove the great weakness of narrow plates, for every one of the thick plates broke across when fired at by the 100-ton gun.

In comparing the effect of guns upon plates a formula is used deduced from practical experience, and by which the efficiency of each gun is expressed in terms of the thickness of wrought-iron plate it is capable of penetrating. The resistance offered by armour to penetration was for some time considered as varying with the square of the thickness; it has been determined within the last few years that the resistance varies with the $1\frac{6}{10}$ths power of the thickness, and thus the gain of extra thick plates is less than was formerly supposed. Using this rule, and ascertaining also the striking velocity of shot from a given gun at a given range, the weight of shot also being known, the amount of penetration of a plate of average quality may be made a matter of calculation, and plates may be matched against guns. If a gun is not capable of piercing through a given plate, it will obviously penetrate it to a less depth than it would be equal to if the plate were only just a match for it, and this being taken into account the results of successive experiments come very near the predicted result. It is interesting to notice the details of some of the experiments as showing exactly what may be expected of armour as regards the effect of guns already carried on board ships.

The 38-ton gun, as at first tried in 1876, was fired with a charge of 130 lbs. of powder and a projectile weighing 812 lbs. By the formula used by the Director of Artillery its calculated power

of penetration would be 19¼ inches; it did actually pass through a *sandwich* target having three plates each 6½ inches thick. Afterwards the 38-ton gun was altered so as to take a larger charge of powder; its calculated penetrating power was then 21 inches, and it was opposed to a target having a total of 26 inches of iron; it penetrated this to a depth of 20 inches. The gun which recently burst on board the *Thunderer* was a 38-ton gun, and there are no larger guns than this afloat at present. It is therefore of some interest to know that its limit of penetration under the most favourable circumstances is 21 inches. The *Inflexible* is the only ship in the English Navy which has armour exceeding this thickness, and the *Dandolo* and *Duilio* are the only war ships in the possession of any foreign power which come up to it. Thinner armour of course is of some use against the 38-ton gun when the destructive shell is substituted for the shot, which merely penetrates.

Similar results were obtained by the tests of the 80-ton gun, which has a projectile weighing 1,700 lbs., and was in the first experiments fired with a charge of 370 lbs., which gives a calculated penetrating power of 28 inches. It was tried against a *sandwich* target consisting of four 8-inch plates, and actually penetrated 25 inches. The 80-ton gun was also chambered to take a larger charge of powder, when its shot would, by the formula, go through a solid plate 30 inches thick. It was tried against a target containing 32 inches, which was more than a match for it, and actually penetrated as far as 27 inches. Experiments were also made with shells both from the 38 and the 80-ton guns, but the experiments were made upon unbacked plates, which circumstance detracts much from their value. On this point Captain Browne remarks:—"It would be of great practical value to our fleet if it were known exactly what thickness of armour was sufficient to cause even the largest shell to explode, before it had power to fire the backing and wood of the ship; because if a vessel were rendered secure against being set on fire, she might stand a great quantity of shot fragments and langridge passing through her side. Probably all our newest ironclads, say those carrying over 12 inches of armour, are in this condition of com-

parative safety, perhaps many more; in any case this would seem to be a subject well deserving further experiment."

The most effective weapon against wrought-iron armour is, as we have said, a comparatively small shot at high velocity, and the most effective projectile one which is best adapted for punching. The cast-iron armour to which we have referred is of an exactly opposite character, difficult to punch, easy to smash. Captain Browne dismisses it from consideration as a material for ship's armour. He says it has been used in much greater thickness than wrought iron, and, for a time, shot produces no apparent effect, but after continued fire it cracks, and soon after crumbles to pieces.

The information which we have as to the efficiency of steel armour, is partly derived from the trials made with the 100-ton gun, by the Italian Government, at Spezzia. A detailed account of these experiments was given by our Italian contemporary, *Rivista Marittima*, in the number for December, 1876. Wrought-iron armour plates of English manufacture, 22 inches thick, were used on some of the targets, and on others were steel plates of the same thickness, manufactured by Schneider and Co., of Creusot, in France. We are not informed of the precise character of the steel, but we should suppose it was hard steel, and it appears to have been manufactured by the Bessemer process, and afterwards by hammering. The result of the experiments was that the shot from the 100-ton gun went completely through the iron plates and the backing behind them, showing that there was much greater penetrating power than was used up by the plate, but it only just penetrated the steel plate. All the plates, however, were broken. In some other experiments with much smaller guns, the iron plate was partially penetrated, but little injured, while the steel plates showed signs of cracking, which clearly prove that though superior to the iron as regards one very heavy blow, they were much inferior in powers of resistance to the fire of comparatively small guns.

There are also some important results of more recent English trials of new kinds of armour, but we think they are anything but conclusive. The first series were carried out at Shoeburyness, the

second on board the *Nettle*, at Portsmouth. Four different kinds of plates were tried, three of them being combinations of iron and steel, the fourth was a mild steel plate. One of the combination plates proposed by Sir J. Whitworth was of soft steel with hard steel plugs screwed into it at intervals. It was expected that the plugs would break up the shot. This plate, however, was not made in the way desired by the inventor, and the same was said also of the other two combination plates. The first of these was made by running molten steel between two wrought-iron plates which were at a welding heat, one iron plate was $\frac{3}{4}$-inch, the other $1\frac{1}{2}$-inch, and the total thickness 7 inches. The second of 5 inches of steel and 4 inches of wrought-iron was manufactured in a similar manner. The result of the trials appears to have been that all four of the plates resisted penetration better than an iron plate of corresponding thickness, but were more liable to rapid destruction from continual fire. So far the conclusion derived from the Spezzia trials appears to hold good for all armour in which steel is used.

As regards power of resisting long continued fire, iron armour appears fully to holds its own, and according to our present lights steel-faced armour will only be adopted, from the consideration that no plate in an engagement is likely to be exposed to anything like the extreme trials made for experiment. It may, therefore, prove the best policy to have plates which will resist penetration rather than those which are not liable to split and crack from continued battering. It has recently transpired that, with this view, the Admiralty have decided to use steel-faced armour experimentally on the turrets of the *Inflexible*. It will be manufactured by first rolling an iron plate, and then pouring fluid *hard* steel upon the red hot iron, it being believed that by this process the two materials become welded together. The plates are to be made at the Cyclops Works, Sheffield. In consequence of the uncertain results of the new method of manufacture, the Admiralty have wisely determined to subject every plate to the firing test. It is the custom at present to take at random one plate from a parcel of armour plates and have it fired at, the acceptance or rejection of the parcel depending upon the result. The new com-

pound plates will be made of extra length to admit of one end of each plate being fired at, and then the injured portion will be cut off and the plate used, if the result be satisfactory. By this means a series of experiments will be made upon the resisting powers of steel-faced plates, and upon the results their future will materially depend. The Italians have decided to use steel armour to a large extent in their most recent ironclads, the *Italia* and *Lepanto*, but the steel in this case is manufactured by M. Schneider, and is somewhat like the mild steel lately brought into use in shipbuilding. If the compound armour should not succeed, we would suggest that a solution of the question may possibly be found in the use of a metal intermediate between the mild steel, used in ordinary shipbuilding, and hard steel, giving up some of the tenacity and endurance to be obtained only in wrought-iron or mild steel armour, and obtaining a greater resistance to penetration in exchange.

We believe that none of the ironclads building at present for our Navy will carry thicker armour than the *Inflexible*. The *Ajax* and *Agamemnon* are really reduced copies of the *Inflexible*, and carry thinner armour. The time will come, however, when the question of a further increase in armour thickness will have to be considered, and it will be well if the question of the best material is finally settled before that time.

A TRIP TO QUELPART, COREA.

(*Communicated.*)

[We are indebted to the courtesy of the Assistant-Secretary of the Marine Department of the Board of Trade for the following interesting account of a visit to a comparatively unknown region.—Ed. *N.M.*]

DURING the latter half of the month of October of the present year, very heavy gales and a typhoon blew with great force along the China coast, and at sea as far as Japan, by which many vessels suffered. Among others, the barque *Barbara Taylor*, Captain Taylor, on her way from Shanghai to Nicolaievsk, was overtaken by the typhoon, her sails were all blown away, and she finally had to run on shore on the southern coast of Quelpart Island. This island is about fifty miles long, running nearly east and west, and about twenty-five miles wide. Fortunately, for the crew, she went on shore at the foot of a small bay, and just as the tide had commenced receding, thus giving the men a chance to get on shore. The Coreans, who inhabit the island, received them with every mark of kindness, and the officials immediately not only provided them with a house, but assisted the captain to land all that was moveable and a great part of the cargo, as well as to keep off all pilferers. The captain was escorted to the capital, situated on the northern side of the island, and managed to get passage in a Japanese junk which had been blown over to Quelpart, and finally arrived at Nagasaki.

After vainly looking about for some days for a steamer to go over to save what could be got of the cargo, and to bring back the crew, the s.s. *Hakon Adelsten*, Captain Bergh, was chartered, and on Monday, the 21st instant, at 3.30, the anchor was tripped and the steamer started for *somewhere* in Quelpart. The passengers consisted of Mr. Paul, H.B.M. Representative; Captain Taylor, Mr. Ringer, Agent for the captain and owners; Mr. Takeda, a Japanese, acting as Corean interpreter; Mr. Mancini, and Mr. Gower. Besides

these, there were 22 Japanese coolies with *dumbies*, or lighters. The passage at sea during the afternoon and night was smooth and pleasant, and at daybreak we sighted the south-eastern part of Quelpart Island. We arrived within two miles of the coast about 8 o'clock a.m., and ran up the coast in a westerly direction, looking out for the wreck, which we soon saw by the masts showing over a low point running into the sea. We rounded this point, and came in full sight of the wreck lying high and dry at the foot of the bay, with a small list shorewards. On the shore at the back of it, a group of small huts could be seen, with a number of persons, conspicuous by their white dresses, looking at us approaching. Through our glasses we could see men dressed in white, others in blue and scarlet, and, what satisfied us most, the European mates and Chinese crew belonging to the wreck. Our passage took about eighteen hours. A boat was lowered from our steamer, and Mr. Paul, H.B.M. Representative accompanied by Mr. Takeda the interpreter, and Captain Taylor, approached the shore and were shown a spot behind some rocks where they could land, as the whole coast is nothing but a mass of volcanic rocks and lava. They had to land about half-a-mile from the wreck and to scramble over these rocks for some distance. They were met by some Coreans who accompanied them to the tent and hut at the back of the wreck where the officials received them with music, consisting of three flageolets and cymbals, which from the ship sounded very much like a Scotch bagpipe. An interview took place, at which the Coreans were thanked for their kindness and attention to the crew and trouble taken in looking after the cargo and ship. The chief Corean officer was glad to see them and was willing to give assistance in shipping the cargo. They however preferred not having the Japanese on shore. After this, and about noon, the interpreter was left on shore, and Mr. Paul, Captain Taylor, and the first and second mate of the *Barbara Taylor*, came on board, and I learned from them that the Corean officers on Captain Taylor's landing actually embraced him, showing every sign of the kindliest feeling and friendship.

After tiffin the ship keeping up steam as she feared anchoring on account of the heavy swell, one of the two dumbies, or cargo boats,

was lowered, and about 30 bags of rice, a few pieces of shirting, and a bundle of Japanese umbrellas were put in it, and Mr. Paul, Captain Taylor, Mr. Ringer, and Mr. Mancini proceeded to land. The tide having run out they had to land a little further to the eastward, and then with the presents proceeded to the head-quarters, when another friendly chat took place and two bottles of gin were presented to the Head Mandarin, who, on drinking some of it, expressed through the interpreter "that it warmed his heart." He, however, refused to take any of the presents brought over, and the articles had to be brought back to the ship, the umbrellas being intentionally forgotten. During this interview it was settled that the next morning, very early, we should commence shipping the wrecked cargo. The weather looked threatening with wind from the south. The *Hakon Adelsten*, therefore, put out to sea, keeping a few miles off the coast.

On landing on that day we learned of another terrible catastrophe at sea, by finding that the wrecked crew had received in their midst a young Italian sailor, the only survivor of a crew of fourteen persons belonging to the *Bianca Pertica*.

We remained at sea all night as the wind was from the south. Towards morning it changed to the north and north-east, and at daylight we again stood in for the shore, to the westward of the bay in which the wreck lay. In approaching we saw a junk, painted red, at anchor under the shore; we then turned east, ran up the coast, and entered the bay, where we anchored not far from the wreck, with the wind off shore blowing fresh, the steamer dragging at times, the bottom being all round boulders. Mr. Paul landed with the interpreter and Mr. Ringer to see if all was in order to start work. The Chief Mandarin having reported that he had 100 coolies ready to take cargo to the landing, they returned on board, and both dumbies, with half of the Japanese coolies, were sent on shore to receive the cargo, one of the steamer's boats assisting all day in towing the dumbies; native officers and soldiers being placed along the road, at suitable distances, to see that all the articles safely reached the dumbies, and also to hurry on the native coolies.

In the afternoon, Messrs. Ringer and Mancini, with Captains

Taylor and Bergh, went on board the schooner with the crew, and got out a large quantity of the cargo yet remaining in the ship, and stripped the vessel of copper, yards, sails, ropes, blocks, &c., which were shipped in the dumbies at high water and taken on board.

During the morning a native boat came along the western shore, and anchored near the wreck. Some eight or nine natives were in the boat, and propelled it with oars, as the Japanese do.

It moved over to the landing where the cargo was coming off, and soon got filled with a number of islanders, and started for our steamer; Mr. Paul, who had gone on shore with the interpreter, preceding them in one of the dumbies. As they neared the ship, officers could be seen on board, and Captain Taylor was endeavouring to guide the craft, which headed for the bow of the vessel, and finally got on the wrong side of where the steps were affixed. Babel was nothing to the noise, cries, orders, and general confusion on board, whilst the Chief Mandarin, perfectly helpless, was seen peeping above a bamboo deck in the stern. After much yelling on all sides, they were made to understand that they must go under the other side to the steps. The moment the boat touched there was such a rush of lower and higher class men that we feared the ladder would break under their weight, and give some of them a sea bath. After many had rushed on board, the Chief Mandarin —an old man, 67 years of age, minus an eye and his upper front teeth—was assisted on board. His dress consisted of an outer long garment of dark brown satin brocade, with scarlet and yellow sleeves; the under garment and loose trousers were of blue silk, with tight trousers under the latter, white stockings (Chinese pattern), and yellow leather shoes, something between a Chinese and foreign slipper, terminating in a sharp upturned point. The rest of the people wore white and straw coloured clothes of the same shape, the material resembling grass cloth; the upper class have hats of grass cloth or dark fine wire, the former stiffened with some kind of glue, the rim being supported to the top of the crown by small pieces of bamboo. The Mandarins' hats have the crown pine apple shape, with the usual wide flat rim made of fine wire, and hanging from the top is a fan-shaped appendage made of

peacocks' feathers. The Chief Mandarin wears a chain of beads, which hangs from his hat down to his neck, and back to the other side, much the same as ribbons do on ladies' bonnets; the beads were of coral and amber, the former about half an inch in diameter and the amber one inch in diameter.

Each one has a bâton of authority, the highest men having carved heads to them and large silk cords attached.

The lower class wear a dress very much resembling the one described, with straw shoes, and enormous flat felt hats, the felt half-an-inch thick.

All classes wear a net on their head under the hair, made of black silk thread or wire, from half way up the forehead at the crown of the head a circular opening is left for the hair, which is tied up in a knot, to pass through. In the case of the highest officers this knot was also covered with a wire fancy knot, which fitted in the hat.

They smoke long pipes similar to Chinese, and use a tobacco leaf which is simply dried, without fermenting or preparing.

But to return to our visitors whom I have left on deck. Mr. Paul introduced Captain Bergh and others to the Mandarin, the old gentleman seeming delighted at what he saw. He was escorted, as soon as possible, to the cabin and placed in a chair, being followed by several of the high officers, who all seemed astonished at the beauty of everything around them, expressing themselves by the Corean word *chiotah*, meaning very fine, very fine; they partook of refreshments, gin being their favourite liquor, which they drank, without water, by the half tumbler, and without even winking, calling out *chiotah! chiotah!* They brought on board two bottles of native wine and a couple of dozen hams, boiled, but very little larger than a man's hand, which were pronounced very good by those who ate them. As they had refused to accept our presents we objected to theirs, but, finally, accepted them to please them, as they informed us they would be punished if they took them back.

They were all shown over the ship and engine-room, and seemed pleased and surprised at the machinery; but what delighted them most was the steam-whistle which, blown at first

without their knowledge, upset some of them on the deck to the great merriment of the rest.

We finally got rid of the greater part of them, and the Chief Mandarin as soon as he got on board disappeared under some mats, at which I was not astonished when I heard that he had swallowed half a bottle of gin. Some of the rest, and next in rank to him, remained on board and insisted upon getting a list of all the men on board, and their names, which was refused; and after vainly asking again they were landed by one of the steamer's boats. I forgot to mention that two or three persons came on board whom everybody took for women, but found they were male attendants on the Mandarin; they wore their hair in a long tress, and had white flowing clothes, and being young and beardless were easily mistaken for females. One of those seemed very willing to come to Nagasaki.

Two of their musicians, playing the flageolets, came on board and gave us some of their music, which astonished me as much as did Japanese music the first time I heard it. I gave them "God save the Queen" and "Auld lang Syne" on the concertina, which pleased them very much, and they all tried to get a tune out of the same instrument.

I examined the boat that brought the officials on board, the only one in fact which we saw on the coast during our whole stay. It was very roughly put together with clamps, as in Japan, but the boards seemed of hard wood, something like oak, and had been faced with an axe and not cut by a saw; the bow of the boat was flat and the body of the boat of great diameter, and nearly double the size of our dumbies. The only other means the natives have of going afloat to fish is by a sort of catamaran. A number of logs about fourteen feet long are fastened together, and on the top of these, uprights, about two feet high, are well secured on this raft. On the top of the latter two frames are fixed covered with bamboo and mats for the people to stand on; with this they go out fishing, being propelled by one oar fastened at one end of the raft in the Chinese fashion. They seem very safe even in a rough sea, and must cost very little to build.

In the afternoon I landed, and walked over a very rough

volcanic shore to the huts where the officers reside. The whole road was lined with Coreans, who had come from the interior to see the big ship and the wreck. They all had the same deep and large hats. Two, however, I observed with garments made of fox skins. During my stay on the rocks opposite the wreck I was accosted by a fine-looking Corean officer, and then by two more, who examined me most thoroughly, even to taking my shoes off and admiring my socks; but the linen shirt seemed to take them the most of all, making signs to me that their own clothing was coarse and dirty. I saw a couple of natives chastised by the police, a matter which seems to take place every few minutes, the officers keeping everybody in subjection by the rod, and which I will hereafter describe. I observed on the shore some pieces of tubular sponge, but much torn. The whole afternoon boats were kept busily at work between the wreck and the steamer, and after sunset we returned on board, all pretty well tired out.

We remained at anchor in the bay all night, with a light breeze blowing off the shore, and arrangements were made to be up at daybreak. At daybreak a cup of coffee is taken, after which Mr. Ringer, Mr. Mancini, Captain Bergh, and Captain Taylor go on shore with the boats and Japanese coolies, and commence sending off cargo from the landing-place and yards cargo, and part of the rigging from the wreck, so that it seemed as if we might during the day get everything on board, but *l'homme propose, et Dieu dispose.* About 7 a.m. the breeze died off from the north, and a S.E. swell commenced in the bay. At 9 a.m., the wind was blowing from the eastward, and the first officer, knowing we had dragged the day before, and having instructions from the captain, immediately got up steam and weighed anchor. Soon afterwards we saw the launch coming off with Mr. Mancini, Mr. Ringer, and Captain Bergh. At this time we were heading out. The *dumby* was with some difficulty got on board, and the interpreter, who had come off with some high officers in the native boat, came on board. They were sent back with the assurance that we would be back the moment the weather would allow. A curious accident happened. Our first officer let himself down by a rope to fasten another rope to one of the yards which had come alongside;

he got over the side with the rope, and took a fine plunge into the sea, luckily missing the yard. It seems that he believed the rope was fast on board, whilst it was loose, and this was the cause of his involuntary bath.

Captain Taylor was left on shore, and we put off to sea, where we remained all day in a heavy swell, with a fresh gale from the east. The *Hakon Adelston* was as quiet as though she had been at anchor in port, and we were thoroughly enjoying it. Our fellow-passenger, Mr. Mancini, to kill time, made us two dishes *a l'Italienne*, which were enjoyed and praised, and with our sea-appetites disappeared like mist. We entered the bay in the evening, and lowered a boat for Captain Taylor, after which we put out to sea where we passed the night, a fresh gale blowing all the time.

At daybreak on Friday we again make for the land, and anchored in the bay, but this time on its eastern side, where we find good holding ground and a hard sandy bottom. Boats and *dumbies* were immediately lowered and sent on shore with coolies, Mr. Ringer and Mr. Mancini accompanying them.

Some of the new officers just arrived from the Capital of the Island, with others who had been on board pay us a visit, and are met by Mr. Paul and the interpreter, to whom they bring back the umbrellas left on shore, wishing to return them. On the other hand they brought with them several presents consisting of dried awabi, about one hundred pounds of awabi shells, several small bundles of tooth combs, two native pigs (alive), and some chickens. Mr. Paul insists on their accepting something, arguing that unless they accept something from us, we cannot accept anything from them. A long discussion ensues, resulting in the acceptance of the bundle of umbrellas. Many of the natives are evidently unaccustomed to the sea, as not a few felt very sea-sick with the slight motion of the steamer.

Mr. Paul went on shore, and he with the interpreter and foreigners had a meeting with the officials to thank them for all their kindness and attention to the wrecked people, and for the care and trouble they had been at in guarding them, as well as the ship and cargo. To this the officials replied that it was nothing more than their duty. May I ask my readers in what part of the world has more liberality

been shown than in this particular instance? The crew of the wreck are taken care of, housed, and supplied with food, and at times with such luxuries as chickens, etc., and soldiers are detailed from the Capital of the Island, to protect people, ship, and merchandize. The captain of the vessel is taken to the Capital at their expense, is brought back to a place on the shore, where a Japanese junk is lying at anchor, and is eventually dispatched to Japan, meanwhile the crew are carefully fed, and the cargo as considerately watched. When our ship goes there, the officers seem as happy at meeting Captain Taylor as if he were a brother; they try to express themselves, and finish with an embrace to show their kind feeling towards him; they never once during the stay of the foreigners made one unpleasant remark, which by-the-bye we should not have understood except by their expression, for there are in the human face certain lines which clearly indicate a feeling of friendship or enmity.

I may say of these islanders that their countenances expressed nothing but kindness and candour, and not one of us, I am sure, can complain of an unkind word or look whilst we were among them. Assistance was given when asked, men were put at our disposal, and the cargo was transported to the boats for a long distance, and, although our readers will scarcely believe it, all this was done by a people who, as I have said, had the reputation of killing foreigners, without so much as accepting one cent of remuneration. Apologising for this digression, we will return to our narrative. During the day all the cargo that could be secured was brought on board. Captain Taylor and Mr. Mancini went to the wreck, saved all that could be moved, and cut the masts main and aft, which fell overboard on the rocks with a great crash. The wire rigging, all the sails, &c., were transported to the landing, and thence conveyed on board. The officials had been at great trouble and expense in looking after the wreck, and they informed us that at the moment of our departure they would fire the ship, as they did not wish the lower class of islanders to get at the wreck, and so be encouraged in pilfering, as they themselves could not undertake to look after it after we had left. At five o'clock in the afternoon we had everybody on board, to wit, our own

crew and Japanese coolies, the wrecked crew, and the Italian, who was the sole survivor of the *Bianca Pertica's* crew.

Boats were hauled up and secured, as were also the *dumbies*, and we weighed anchor, waving our handkerchiefs to the Corean officers on shore; the steamer dipped the flag three times, the whistle was blown as an *adieu* to the people, and we left the island at 5.30, heading for Ki-sima, one of the islands of the Goto group. The minute our engines commenced to revolve, a small cloud of smoke was seen issuing from amidships of the wreck, the forward house soon being in flames. As we distanced the shore we could see the fire progressing, and by nightfall, although below the horizon, we could see by the glare that the fire had taken hold of the remains of the poor *Barbara Taylor*, and that a few hours more would leave nothing but a few charred timbers of her lower ribs and keel.

Everything having been made snug, and sails set, we sped along with a fresh breeze and a pretty heavy sea at the rate of nine knots an hour. We had a pleasant dinner, and as usual went on deck afterwards to enjoy our evening cigar. We had not been long there before a cry from the water reached us; I imagined it was a boat close by, and ran to the side to ascertain if such was the case, but seeing none, I immediately called out that there was a man overboard. The captain instantly stopped the engines, but having sail on we were forging fast ahead.

On this alarm, Mr. Ringer and Captain Bergh went forward to ascertain if anyone were missing, they found the Japanese looking for a comrade, whom they found sea-sick near the smoke-stack; the muster of the men being reported correct, the engines were again started and we continued on our way. The night was rather rough, and even the stately motion of the *Hakon Adelsten* was tolerably mixed. At daylight we made the Gotos, and passed Kii Island between 6 and 7 a.m. After breakfast a Japanese came and reported to Mr. Ringer that when they assembled for breakfast they found one man missing; the ship was searched, but the man was gone, and what we had heard on the previous evening was, without doubt, his cry for assistance. The night was dark, very dark, with a rough sea, and I greatly doubt had we lowered

a boat whether we should have got it on board again or even found it, and probably all efforts to save the unfortunate man would have been unavailing. This rather damped our spirits. We arrived safely in Nagasaki soon after mid-day. I must not close this account of our trip without a word of reference to our worthy captain, who not only piloted us to and from an unknown shore where many unseen dangers exist from sunken rocks, but rendered great assistance personally in saving much of the cargo, and by his kindness and hospitality on board, making everyone thoroughly at home as he did, contributed in no small degree to enhance the pleasure of such an interesting excursion.

I will now mention a few particulars I was enabled to learn concerning the island, its people, and their customs; these were gathered partly from Mr. Paul and the interpreter, and partly through my own observation. Quelpart, the largest and most southern of the islands belonging to Corea, is situated in longitude 126° 10′ to 126° 57′, and latitude 33° 12′ to 33° 35′, having Beaufort Island at its eastern extremity, Eden Island at its west end, and Barlow and Gifford Islands on the south side. The wreck lay in a shallow bay, longitude 126° 40′, latitude 33° 15′.

The anchorage on the west side of the bay is rocky with a bad holding ground, whilst on the east there is a good sandy bottom affording fair anchorage.

The district, including the village near the wreck, together with several others, is called in Corean, *Chiegui*. We approached the Island as I mentioned before, from the south-east and ran in a westerly direction. The eastern part of the coast is remarkable. A cape rises up on the seaboard like a castle, and is connected with the mainland by a low neck. The land rises gradually from the sea to the hills which form the backbone of the island, and seem to be partly cultivated, each field being divided from the next by a wall, and this seems to be the case as far as the eye can reach.

A great part of the land is devoted to the pasturage of ponies and cattle, and the hills are heavily wooded, with the exception of the highest mountain. The soil, though volcanic, is rich, on which the inhabitants raise wheat, barley, buckwheat, etc. The turnip

seems to be the principal vegetable cultivated. The climate is not very warm in summer, but there are heavy fogs, which keep the place cool, and in December, January, and February, there are heavy snow falls.

The island called Chichin, seems to suggest the idea of volcanic origin, although we only saw two places which verified this opinion. One on the top of the highest mountain, which seemed to have been the northern wall of a crater, the other three sides having disappeared. The other, a hill about three miles from us to the eastward, which appeared as if the remains of a lower but larger crater elevated only about 200 feet above the level of the sea, had once existed, both of these appearing to be metamorphic. The whole of the seashore as we steamed along, was nothing but a bed of lava, which in ages past seemed to have been poured into the sea, and even now the effects of these molten masses coming into contact with the water were visible. On the gently rising plain, I distinctly saw three small craters, at long distances from each other, and in each case the southern wall, that is to say, the one toward the sea, seemed to have given way, and the volcano was left looking like a gigantic basin with a gap in its side.

Time, however, as it does with everything, has disintegrated these lavas, forming flourishing plains with the hills gently rounded off into smooth verdant slopes which, at a distance, look like soft carpeted meadows; and I have no doubt that the whole of this southern aspect would, in foreign hands, produce abundant harvests and fruits. The grape would flourish in such a soil, and, from its favourable position, the island might, in course of years, become an important wine-producing country. The houses or huts are built square or quadrangular, of rough stones and mud, one or more of the sides having a sort of verandah; the floors are made of clay well beaten, the roofs are of light timbers, and of a lower pitch than those of Japan, and are covered with long reeds and small bamboos; they are nearly round at the peak. Large bamboos stretch from end to end across the roof, at distances of three feet each way, forming a network which is secured through the thatch to prevent the wind blowing off the reeds. They use

sliding paper doors as in Japan. The plough is used, but it is of a most primitive description, and is worked by cattle. There are two or three pretty large towns on the island, the capital being situated on the north coast and nearly in the middle, where all the government officials reside. The city is walled, and admittance is gained through gates which are placed at different points. The chief officer of the government, and two or three others of high rank, are men who come over from the Corean capital, all other officials are natives of the island, and the different government positions are hereditary, even down to the soldiers. The city is called Chlegiufu, and the head official is the Taionsha, who has under him many officers called Prionsha, who are chiefs of districts. The one at the wreck was a Prionsha. Another officer resides at the capital, called Hanguan, a civil officer, who adjudicates cases, this office being performed in the districts by the Prionsha in small cases only. Their punishments are of three kinds: decapitation for murder or political offences, imprisonment, and whipping. The latter from what we could see, was an affair of constant occurrence, for the slightest offence was instantly punished, the Mandarin standing by to see the blows given. The men who inflict the punishment are a sort of police and executioners; they are dressed in blue with white facings, and wear a small conical hat with a wide brim turned upwards. Each carries in his hand a bâton, which is in shape like a short oar with the round part cut about two inches above the blade. At a given signal the executioner throws off the man's hat, takes him by the top-knot and throws him on his face on the ground, his dress is raised and his lower garments pulled down to the knees, when the bâton is applied with might and main to his thighs until the amount of blows the unfortunate is sentenced to is completed. It so happens at times that the official, thinking the executioner has not done his duty well, has him put down and punished likewise, the Chief Officer thus punishing the higher officials if they do wrong. The population of the island is about ten thousand, and at the capital they have a military depôt. The soldiers wear a long blue dress, with loose trousers, with scarlet facings covering half the uniform both in front and behind, and they wear felt conical hats with wide up-

turned brims and a scarlet streamer. Their arms are swords, small lances, about seven feet long, and fusils.

Men of importance are buried in enclosures with stone walls, each having one for himself. A long mound is made over the grave, and the size of these enclosures varies according to rank, the lower classes having none. Large round signal towers, evidently very old, some thirty feet high, built of stone with a cornice within a short distance of the top, and having an entrance from the land side, are erected along the whole coast, on every cape, and on the tops of the hills, to notify the capital, by day or night, of the approach of an enemy.

They use the Chinese characters in writing, but speak the Corean language. In religion they are Buddhists and followers of Confucius.

Earthquakes are occasionally felt on the island. From the northern side they are in constant communication with the mainland.

Their marriage ceremonies are very much the same as those of Japan, differing only in this that the bridegroom is married in the bride's house, where he remains one day returning to his own on the next. Only one wife is allowed, and concubinage is not permitted.

Their amusements seemed to consist in singing, playing on instruments already mentioned, and dancing; the latter is performed by dancing girls, and which, judging from the specimen I witnessed on board, resembles the Japanese. Very little is manufactured on the island, all cloth being imported. They make small articles of metal, such as pipes, which are larger than those of Japan. Copper ore exists in the island, but whether worked or not I could not ascertain.

From what we could see, the women seemed to be very hard worked in the fields. They were studiously kept away from us, and I must confess I did not see a pretty one. Their dress consists of a short tunic, a large pair of loose trousers, and an under garment, which shows below them. The hair is worn in long tresses, hanging behind the shoulders. Taxes are heavy; but we could not ascertain the actual amount levied. Pheasants, deer, and wild pigs abound on the island.

A few Corean words, which I picked up, I give below: Good morning, *ose;* good-bye, *toposai;* very fine, *chiotah;* man, *sunahai;* woman, *kechin.* The name of the principal mountain, 6,000 feet high, is Harrosen; the name of the Prionsha at the wreck was Kimuisen, and the three army officers who came on board were called Aihakuma, Kamshaka, and Soutzuoko. The king's title is Shoippin, corresponding to the Japanese Shoici. Having thus given the little information I could gather, I will close this narrative of what to me was a very delightful trip to a fine island, with the remark that I would gladly re-visit and thoroughly explore it could permission be obtained.

MARINE LIFE-SAVING APPARATUS.

THE Committee of the Society of Arts has awarded the gold medal offered by them for the best life-saving appliances for saving the lives of the whole of the crew and passengers, however numerous, when their vessel has to be abandoned with only five minutes' notice, to Mr. A. W. Birt, of the firm of J. & A. W. Birt, Dock Street, London Docks.

The following is a list and description of the buoyant articles in respect of which the medal has been awarded:—

No. 1.—Hammock Mattress—for the Royal Navy.
,, 2.—Berth Mattress—for men-of-war, passenger and ordinary merchant ships.
,, 3.—Waterproof Sheet.
,, 4.—Soldiers' Life-belts—for troop ships.
,, 5.—Cushion Life-belts—for passenger ships.
,, 6.—Self-releasing Buoyant Grating Seats—for passenger ships.
,, 7.—Buoyant Benches—for passenger ships.
,, 8.—Camp Stool or Chair Life Buoys—for passenger ships.
,, 9.—Bulwark Life Buoys applicable to all classes of vessels.

No. 1.—Hammock Mattress for the *Royal Navy*, with numerous

partitions to prevent the cork from moving about, with a hinge, not only to facilitate the lashing-up of the hammock, but also the securing the mattress round the waist as a *safe* life-belt when used alone. This mattress has a surface on one side of best horsehair, to make it as comfortable for the seamen as the present horsehair mattress. This mattress contains 11 lbs. of granulated cork, 2½ lbs. of hair; buoyancy, over 50 lbs. The corners are rounded, to facilitate lashing-up neatly.

No. 2.—Berth Mattress, with similar partitions; also with a hinge, with or without hair. This mattress contains 15 lbs. of granulated cork; buoyancy, over 60 lbs.

No. 3.—Waterproof Sheet.—A sheet of stout calico, 4 feet by 8 feet, roped with stout white line, becketed at the corners; weight, 4 lbs.; waterproofed with a composition of which boiled oil is the principal ingredient, with other ingredients to prevent its becoming sticky in hot weather. This sheet is to be placed and always kept *between* the hammock and the mattress, not as is usual with sheets, *above* the mattress. When the seaman lashes his hammock up, he will wrap the sheet round the mattress and blanket, bringing the edges of the sheet together, sides and ends, so as to make it as difficult as possible for the water to enter when the hammock is immersed. This sheet will give the hammock over 100 lbs. buoyancy so long as the water does not enter inside the sheet, viz., 60 lbs. in addition to the permanent buoyancy of over 40 lbs. derived from the cork mattress. The permanency of the extra 60 lbs. buoyancy derived from the waterproof sheet entirely depends upon the men who rely upon it for support, abstaining from pressing it downwards under the water unduly, for if they do so, and the water forces its way among the particles of cork and of hair or of both displacing the air, the extra buoyancy of 60 lbs. will soon be destroyed, and only the permanent buoyancy from the cork will remain. This sheet may take the place very advantageously, when the seamen are landed for a campaign, of the macintosh sheet (vulcanized india-rubber) supplied to the soldiers, which is much heavier, much smaller, much dearer, much more easily injured by climate and by wear and tear, becoming sticky in very hot weather, and stiff in cold weather. The sheet

will also serve to make a tent—two sheets for the tent, and one for the three men to sleep on; or to shelter the men when "resting" two at a time together, one sheet on the ground, the other as a cover to the two men, as a protection against rain or cold, and also act as a cloak on sentry duty in wet weather.

No. 4.—The Soldier's Cork Life-belt.—Weight, No. 1, 11 lbs.; No. 2, 7 lbs. Buoyancy, No. 1, 40 lbs.; No. 2, 25 lbs. Dimensions of each quarter of the belt $12'' \times 7\frac{1}{4}'' \times 4\frac{1}{4}''$, $12'' \times 5\frac{1}{4}'' \times 3\frac{1}{2}''$. Length of line 10 feet.

A No. 1 life-belt has 40 lbs. buoyancy, and can float a soldier with his cartridges on his shoulders, and his rifle on his neck, unless his specific gravity is exceptionally great. If he wishes to increase his buoyancy he will place his arms and rifle under water, when his mouth and nostrils will immediately rise. The soldier's life-belt has been designed with the greatest amount of buoyancy in the smallest compass, and with the simplest fitting.

No. 5.—Cushion Life-belts.—The cushions on deck or in the saloons are made in a number of small separate parts, each of which has a strap and buckle to it, and forms a life-belt. A batten is screwed on to the front of the seat to keep the cushion in position and the whole is covered with American cloth or other cover, and thus makes a comfortable, durable, and handsome seat; it can never get out of shape and is very inexpensive, and on the first signal of alarm the belts could be carried on deck by the passengers and secured round the body.

No. 6.—Self Releasing Buoyant Grating Seat.—These seats are lined on the under side with cork, and are fitted with hooks and eyes in lieu of hinges, and in case of the vessel foundering would release themselves, the legs dropping out of the sockets. A seat 5 ft. in length is capable of sustaining four or more persons, according to the quantity of cork attached.

No. 7.—Buoyant Benches.—These benches are fitted with solid cork or air cases of Clarkson's material. A form 6 ft. in length is capable of supporting eight persons, and on sea-going ships two or more lashed together make an excellent raft.

No. 8.—Camp Stool or Chair Life-buoy.—The object of this invention is to utilise the ordinary camp stool now used so

extensively on board all passenger river steamers so as to form a life-buoy.

It will be found capable of supporting well two men. It would be always ready at hand, takes no more room when in use or when stowed away than the ordinary camp stool; its buoyancy is permanent, and it is not liable to injury, and is very inexpensive.

No. 9.—Bulwark Life-buoy.—This life-buoy has two cylinders of cork, each 6 feet in length, firmly secured with a stratum of wood running through the centre to give stiffness. The two cylinders run parallel to each other, about 18 inches apart, or as near that as circumstances will admit, and are secured together with metal braces.

From the construction of this life-buoy, it is immaterial which way it falls in the water, and according to the thickness of the cylinders will have a buoyancy varying from 160 to 240 lbs. When grappled with, it will retain a more horizontal position in the water than any other form of life-buoy, and without difficulty men could get between the cylinders and so remain with comparative ease, while those less fortunate could support themselves at the sides.

A series of these buoys can be placed along the bulwarks or topsides outside a vessel of any class, from the ironclad to the river steamer, so as to form a pair of mouldings on each side, without appearing unsightly. On ships of the Royal Navy, or troop ships, the buoys could be lashed or fitted in such a manner by a simple contrivance, so that the whole number of buoys on a side can be under the control of an officer, and be disconnected from the ship almost simultaneously.

On the sides of the river steamer they could be simply suspended on hooks or brackets, so as to be left floating on the surface of the water in case of foundering.

The size of the cylinders proposed to be introduced for a man-of-war or troop ship would be 7¾ inches in diameter, and a 6 feet length of these dimensions has a buoyancy of over 240 lbs., and capable of supporting six men, allowing a buoyancy of 40 lbs. to each man; it will therefore be seen that a vessel showing a side of 300 feet long can be fitted with buoys capable of supporting 600 men.

For a passenger steamer it is suggested that cylinders of $6\frac{1}{2}$ inches diameter be used, and the number of buoys she would carry would be sufficient for the purpose of supporting all the passengers for which she would be licensed, and as 20 lbs. of buoyancy will float a man (dressed in ordinary costume) with his head and shoulders above the water, then this simple invention alone will be all and more than sufficient for any emergency, without burdening the decks or interfering in the slightest degree with the comfort of the crew or passengers.

CORRESPONDENCE.

THE TERMS "PORT" AND "STARBOARD."

To the Editor of the "Nautical Magazine."

SIR,—I am glad to perceive that in your article in the number for January you neither defend the use of these terms as applied to steering, nor condemn a proposed alteration, but only propose to work out by reasoning the consideration of the entire question.

Will you give me space for a few words as a rejoinder.

The whole argument of the pamphlet to which you allude is based on the statement that "bearing in mind that 'port' means left and 'starboard' right, when a commander of a vessel wants his ship, the wheel, and the rudder to be turned to the right, he must say left, and *vice versâ;* and the intuitive impulse of his mind to say that which he means, has to be corrected before he gives the order."

I wish, after alluding to same of your comments on this question, to deal now with the international inconveniences of the present system, and the probabilities of dangerous confusion that arise in consequence of other nations having declined to follow our example in maintaining this anomaly, in spite of our great preponderance in tonnage.

In my remarks on your article I wish to state that I am by no means wedded to any particular terms, to be substituted for those now in vogue. I wish they could simply be reversed, for no expressions I can find are so emphatic and characteristic; but I acknowledge the impracticability of this sudden step, and whilst pro-

posing "Right" and "Left," instead of "Port" and "Starboard," I recognise difficulties that lay in the way of this adoption, not so much from the possible confusion to which you allude from the order "right the helm" being used in its present significance, but also from a phonetic point of view, "left" being a difficult word to shout emphatically. But this is a minor trouble; if our language is not rich enough to supply a want we can borrow elsewhere, and no term can be phonetically less appropriate than "bâbord" or "tribord."

Let it once be conceded that a change is desirable, and the want of a suitable expression will not stand long in the way.

In your article you say that we must have two sets of expressions, one relating to the rudder and the other to its effect on the ship, and that this is a necessity. It is because I cannot perceive this necessity that I wish to make them uniform, and to describe by the order given the motion that is desired.

I think that the fact of the present terms being applicable to the tiller may be dismissed as an argument for their being retained.

The proportion of vessels steered by a tiller to those steered by a wheel is so small as to be of no value, and this number is rapidly decreasing, the leverage of the former being unwieldy, and requiring more labour than the wheel.

I should look on the abolition of the present terms as not necessarily permanent, and if the sailor's affection for them survived the interval, they would probably be reproduced in a few years in their proper sense, and be doubly welcome as appropriate instead of being anomalous as they now are.

With regard to the international inconveniences arising from our retaining these terms in their present sense, America and Germany are the only countries that universally adhere to our example; France, Spain, Austria, and, I believe, Italy, have abandoned it. The Scandinavian vessels have no fixed rules; they have in theory, but it does not obtain in practice. Small vessels constantly sailing to our ports use our rendering, whilst the larger ones adopt that more reasonable mode which is recommended and supposed to be enforced by their Government's decrees, *i.e.*, that the motion of the pilot's arm, the direction of the ship's head, and the word of command should correspond.

The Germans attribute the loss of the *Grosser Kürfurst* to a mistake in or of the steering orders, and the *Cologne Gazette*, in an article on this collision states, that "of the six men at the wheel, it is now asserted that three correctly understood the order to port the helm, whilst the other three understood precisely the opposite." Two hundred and eighty-seven souls lie placed to the credit of this misunderstanding.

The courtesy of the Superintendent of the Liverpool pilots has enabled me to ascertain the method that prevails at this port on board foreign ships, and I am assured that the pilots do not as a rule venture to give a verbal order for fear of being misunderstood. They find by experience that when a word, say "starboard," is given, either an explanation is demanded as to *what* he wants starboarded, or the helm is liable to be placed to port. Consequently, the pilots confine themselves to motioning with their hands in the direction towards which they wish to go, refraining from any word of command to the man at the wheel.

Of course in large transatlantic steamers with steering telegraphs and helm indicators, the tendency to confusion is reduced considerably. I was on board a large Spanish steamer the other day, a regular trader to this port, and pointing to the starboard side, I asked the captain what order he would give if he wanted the rudder placed that way. "Starboard the ship's head," he replied. On my remarking that this seemed rather a mouthful, he added, "Starboard alone would do. What precautions would you take to prevent the English pilot's orders being misunderstood by the steering man? My men are poor men, they cannot understand your rules; the pilot gives the order 'starboard' to me or my officer on duty, and we transmit the corresponding order 'port' ourselves through the telegraph." This had been an English ship, and the telegraph had been altered to suit the Spanish requirements, both on the bridge and in the wheel-house aft. I refrain from dwelling on the obvious element of danger involved here.

On the subject of steering telegraphs and helm indicators, I would mention, parenthetically, that, as if confusion should pervade universally everything connected with steering, there is no fixed rule for the dial or index of these instruments, sometimes the finger

moves the same way as the wheel, sometimes the reverse. Thus a pilot may leave an outward-bound steamer, when the telegraph has "starboard" on the right side, and "port" on the left (in which case the indicator would move the contrary way to the wheel) and immediately board an inward vessel when the reverse is the case; and "starboard" and "port" are on the port and starboard sides of the ship respectively. I have seen again helm indicators placed fore and aft in the place of the keel; different ships have different fashions.

The Suez Canal will furnish my last instance of international inconvenience. I have never been through it, and rely on information. I am told that the pilots there are Frenchmen, and rather an excitable race of men. They will have to use on British ships contrary terms to their French equivalents, to which they have been accustomed and educated. In this case, however, as the telegraph is always used, and a verbal order rarely given in a long ship, there will be the less danger.

I am, Sir, yours obediently,

Liverpool, March 1st, 1879. GEORGE R. VYVYAN.

P.S.—Since writing the above, I have read A. J. G. C.'s article in your columns.

I am glad to see what can be said in defence of the present system; and I am pleased to find that the writer has attacked with more success the composition than the arguments of the pamphlet referred to.

Passing by the questions of the sympathy of the ships' *stern* with the order given, which I freely grant, and the definition of the word "inadvertence," and merely mentioning that before confessing my having occasionally given the wrong order, I had ascertained that many of the ablest and most successful men in the merchant service owned to the same *loss* of *presence of mind*, as the writer somewhat contemptuously calls it,—I am constrained to defend my adjectives, as attacked in the last paragraph of the letter.

In using the word nonsensical, I did not intend it to be accepted in its harshest sense, but only as the first epithet that occurred to me as opposed to sensible.

With regard to the other two words. If I say to the man at the wheel "starboard your *helm*," or "put your *helm* to starboard,"

what does he do? He immediately, in fulfilment of the order, puts it to the port side of the ship, and it (*the helm*) so remains until the order is altered. If this is not contradictory and anomalous, I fail to recognize the meaning of the terms.

Herein arose the necessity for an officer at the conn in narrow waters, not so much for transmitting the order as to see that it was carried out; the seaman's impulse leading him to follow the direction named, instead of its opposite, for I have no faith in the rivets in the seaman's mind, alluded to by A. J. G. C.

As there can be no question that an order given by motion of the pilot's arm is free from the danger of being misunderstood, whatever the nationality, so the same order, given by word of mouth, unaccompanied by any gesture, is, as I have endeavoured to show, sometimes an element of risk.

In conclusion, I append the following dialogue, extracted from the report (in, I think, the *Times*) of the inquest on the collision between the *Princess Alice* and the *Bywell Castle*, from which it would appear that any rivets that may have existed in one seaman's mind had got somewhat loosened:—"Q. When the order to starboard was given, is it to starboard the helm or the ship?—The helm; then it brings the ship to port. Q. When you came round the point, was the ship starboarding all the time?—Yes. Q. How was the helm?—Starboard. Q. Then the helm and the ship go the same way?—No." The witness was evidently confused in his answers, and explained that he was talking about the wheel. The fact is, as the same paper remarks, "the English sailor's language on this point is so misleading and obscure that it cannot be briefly explained, even by persons familiar with the subject, without the risk of confusion of language."

March 3rd, 1879. G. R. V.

"PORT" AND "STARBOARD."

To the Editor of the "Nautical Magazine."

SIR,—Judging from your article in January's number, difference of opinion on this subject appears to be as great as ever, and none of the proposed alterations in terms appear to be satisfactory.

I am inclined to think the question might be settled in a very

simple way, which would be as intelligible to the landsman, or the novice, as the seaman.

It is presumed that all seamen understand the meaning of "port" or "starboard," whether steering with either a wheel or tiller; but, it is stated that the best of them are at times liable to confuse the order, and to throw the upper spoke of their wheel (when steering with one) to the side named; that the novice has great difficulty in overcoming this tendency, and that the landsman cannot understand it at all.

This difficulty would never have arisen if, when steering by blocks and wheel-ropes was first introduced, the falls had been led to the barrel of the wheel in a different manner, *i.e.*, just the reverse as is now adopted.

Had that been done, the man steering, on being told to "starboard," would have at once thrown the spoke of his wheel over to "starboard," just as he had formerly been accustomed to throw his tiller to "starboard," the ship's head of course going to "port," in each case.

To prevent mistakes arising from these causes, I have occasionally seen two arrows painted on the binnacle stand, one pointing to "port" and marked "starboard," and one to "starboard" marked "port!" If the wheel-chains or ropes were rove the other way, all this confusion would cease to exist. Of course due notice of such a change would have to be given, but were it once adopted I believe that we should soon hear the last of mistakes about "port" and "starboard" helm. To the sailor, "starboard helm" means put ship's head to "port," and the error arises from his treating his wheel as a tiller, and putting it to the side he is told instead of the contrary.

It appears to me to be worthy of consideration whether such a slight mechanical alteration in the turning of the rudder, would not be preferable to attempting to eradicate from the minds of our seamen such "ingrained" words as "port" and "starboard."

Yours faithfully,

Aberdeen, 17th March, 1879. JOSEPH LEEMAN.

WEATHER FORECAST FOR APRIL, 1879.

THE CURRENTS OR TENDENCY OF THE AIR OVER THE BRITISH ISLANDS FOR THE MONTH OF APRIL, 1879.

Date.	Duration.	Force from		General Direction from	Duration.	Force from		General Direction from
April		S.	E. or W.			N.	E. or W.	
1	Noon to 10 h.a.	3	4	E.S.E.	10 h.a. to 2 fol. a.	7	9	W. N.W.
2	2 a. „ 9 a.	4	4	S.E.	9 a. „ 3 „	9	9	N.W.
3	3 a. „ 9 a.	5	4	S.W.	9 a. „ 4 „	11	8	N.W.
4	4 a. „ 9 a.	6	3	S.S.W.	9 a. „ 5 „	13	6	N.N.W.
5	5 a. „ 10 a.	6	3	„	10 a. „ 6 „	13	6	„
6	6 a. „ 11 a.	6	3	„	11 a. „ 6 „	13	6	„
7	6 a. „ 2 fol. m.	6	3	„	... ...	...	...	...
8	7 a. „ 3 „	5	3	„	2 m. „ 7 a.	10	6	N.N.E.
9	8 a. „ 6 „	4	3	„	3 m. „ 8 a.	9	6	„
10	8 a. „ 9 „	2	4	W.S.W.	6 m „ 8 a.	5	8	E.N.E.
11	8 a. „ 9 „	1	4	„	9 m. „ 8 a.	2	9	„
12	9 m. „ 10 a.	1	10	E. by S.	10 a. „ 11 fol. m.	0	5	W. by N.
13	11 m. „ 10 a.	4	9	E.S.E.	10 a. „ fol. noon	2	4	W.N.W.
14	Noon „ 10 a.	7	9	S.E.	10 a. „ „	3	4	N.W.
15	„ „ „	8	9	„	10 a. „ 2 fol. a.	4	4	„
16	2 a. „ 10 a.	10	9	S.W.	10 a. „ 3 „	5	4	„
17	3 a. „ 10 a.	11	9	„	10 a. „ 4 „	5	4	„
18	4 a. „ 10 a.	11	9	„	10 a. „ 4 „	5	4	„
19	4 a. „ 11 a.	10	9	„	11 a. „ 5 „	5	4	„
20	5 a. „ midnight	10	9	„	... ...	...	...	...
21	6 a. „ 2 foll. m.	9	10	„	0 m. to 6 a.	4	5	N.E.
22	6 a. „ 4 „	8	10	„	2 m. „ 6 a.	4	5	„
23	6 a. „ 5 „	6	10	W.S.W.	4 m. „ 6 a.	3	5	E.N.E.
24	7 a. „ 7 „	4	11	„	5 m. „ 7 a.	2	5	„
25	7 a. „ 7 „	2	11	„	7 m. „ 7 a.	1	5	„
26	7 m. „ 9 a.	0	6	E. by S.	9 a. „ 8 fol. m.	1	12	W. by N.
27	8 m. „ 9 a.	1	5	E.S.E.	9 a. „ 10 „	3	11	W.N.W.
28	10 m. „ 9 a.	3	4	„	9 a. „ 11 „	6	9	„
29	11 m. „ 8 a.	4	4	S.E.	8 a. „ 1 fol. a.	8	8	N.W.
30	1 a. „ 8 a.	5	4	S.S.W.	8 a. „ 1 „	10	8	N.N.W.

NOTE.—Sun's gradient probably a S. Westerly rising; receiving a fresh impulse each day about 4 A.

REMARKS.

1. The Table indicates

Strong Westerly tendency on the 1st and 2nd.
„ Northerly „ from the 3rd to the 9th inclusive.
„ Easterly „ „ 10th „ 15th „
„ South Westerly „ 16th „ 21st „
„ Westerly „ „ 22nd „ 28th „
„ Northerly „ on the 29th and 30th „

2. Moon going South from the 1st to the 11th.
   „ coming North „ 12th „ 25th.
   „ going South „ 26th „ 30th.
3. Change from the Westerly to the Easterly currents about the 8th.
   „ „ Easterly „ Westerly „ „ 15th.
4. General Forecast:—
   1st to the 7th Windy or Wet.
   8th „ 12th Showers, Fog, or Mist.
   13th „ 18th Fine.
   19th „ 24th do., with occasional Thunderstorms.
   25th „ 30th Stormy or Wet.

Thunderstorms probable about the 20th, 21st, or 22nd, and again about the 29th and 30th April, or 1st May.

D. D.

BOOKS RECEIVED.

Sea Songs. By W. C. Bennett. London: Chapman and Hall. 1878.

Never since Charles Dibdin stirred the heart of the British sailor with his nautical ballads, have we had such a spirited writer of sea songs as Dr. Bennett, as evidenced by the volume now before us. Not only are the songs spirited and exhilarating, but they breathe warm and healthy emotion, without cant or sentimentality, and are inspired with that breezy freshness with which we have long been accustomed to associate the highest ideal of a sailor's life and duties. We have little doubt that among the seamen of the Royal Navy, and the better class of merchant sailors, these songs will be highly appreciated, and that in the forecastle and on deck, their influence will be cheering and elevating. We fear, however, that the typical sailor of Dr. Bennett does not correspond with the majority of our merchant seamen, and that therefore his charming songs will not suit them. But we can only say that this volume will be a really valuable addition to the library of any ship, and will tend to raise the tone of those who read or sing them.

Deukschrift Betreffend die Internationale Gestzliche Regelung des Rechts-Verhaltnisses der Grossen Haverei. By R. Ulrich, International General Secretary of the Transport Association. Berlin. Mittler and Son. 1878.

A valuable addition to tho many publications on the International

Laws and Rules regarding General Average, which have of late been furnished both by jurists and practical men, is the one now before us of Herr R. Ulrich. In a very compendious form he has given the leading characteristics of the three systems now in force, namely, the law or system of Spain, which to a certain extent prevails in South America, and resembles the French system; the common safety system, and lastly the common benefit system. Attached to these systems are rules which vary to an all but incredible extent in different countries. Thus the vague customs of Lloyd's prevail in England, whilst in Denmark in the absence of any defined law, shipowners and merchants had between themselves agreed to fifty-two articles, which received the royal sanction in the year 1850. Herr Ulrich then gives in brief outline, the state of the law in Belgium, Spain, Norway, Sweden, Denmark, Germany, France, etc., and points to the fact that in all these countries a desire had been manifested to settle the law in regard to General Average losses. In support of his argument that a uniform rule ought to be adopted, he has given several striking instances which are quite worthy of closer study. Finally, the writer recommends the York and Antwerp rules settled at Antwerp at the Conference of the Association for the Reform and Codification of the Law of Nations, for universal adoption; at all events as a sound basis upon which to found common international rules. In recommending the adoption of these rules, he urges that they concur in many respects with the law of Germany and Holland, and that they constitute a reasonable compromise of conflicting systems. The appendices, including a petition to the Reichstag of Germany, will be read with interest. As this question is sure to be before the public for some time to come, we can safely recommend this paper to the perusal of all interested in the settlement of an International Law for General Average.

Useful Arts: a Journal of American Industries, No. 1, February, 1879. Jas. A. Whitney, Editor, 212, Broadway, New York.

Probably no nation excels so much in the practical and ingenious application of useful arts as the Americans, and it is not, therefore, surprising that a journal should spring into existence professing

to represent this national trait. Among a variety of short and generally interesting papers in this maiden number of *Useful Arts*, is one headed "Needed Inventions," pointing out numerous ways in which inventive minds may exercise themselves, and, if successful, may achieve fame and fortune. This is, undoubtedly, a good notion. We should say that if the work continues to be well conducted, and does not degenerate into a mere advertising medium, it will live to occupy a high position in a country so remarkable for native ingenuity as the United States.

The Newcastle (N.S.W.) Nautical Almanac, Directory and Guide to the Port of Newcastle for the year 1879. Newcastle (N.S.W.) R. C. Knaggs & Co. 1879.

As a comprehensive guide to a seaport it would be difficult to excel this annual which comes to us from New South Wales. The growing importance of the mercantile shipping of our great Australian Colony is well indicated by the fact of a publication of this character finding support year after year, but no doubt the inherent merit and completeness of the book itself contributes in no small degree to its success.

Report of the Meteorological Council to the Royal Society for the period of Ten Months ending 31*st March*, 1878. London: Queen's Printers. 1878.

From this Annual Report we learn all about the constitution of the Meteorological Council and its staff as a scientific department of the Government, the nature of its investigations and general duties, and its progress in obtaining, recording, and disseminating meteorological knowledge for the benefit of navigators, agriculturists, and others. The appendices to the Report are really valuable, and by their aid the intelligent mariner may learn how to make his own pursuit of meteorological science serviceable for the benefit of his brother seamen, and an agreeable pastime to relieve the tedium of long voyages. The publication is issued officially, and may be purchased as a Parliamentary Blue Book for the small sum of one shilling.

TIDE TABLES FOR APRIL, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Tu	1	7 51	8 33	0 23	1 5	10 4	10 49	8 58	9 44	11 33	—	5 10	5 49	0 21	1 8
W	2	9 22	10 9	1 46	2 26	11 32	—	10 26	11 8	0 23	1 10	6 29	7 9	1 49	2 30
Th	3	10 49	11 23	3 8	3 38	0 10	0 44	11 37	—	1 53	2 33	7 48	8 21	3 10	3 46
F	4	11 56	—	4 9	4 35	1 11	1 35	0 6	0 29	3 9	3 39	8 47	9 12	4 18	4 48
S	5	0 24	0 46	4 58	5 18	1 57	2 16	0 51	1 11	4 6	4 31	9 36	10 0	5 14	5 37
S	6	1 7	1 28	5 38	5 58	2 35	2 54	1 31	1 51	4 54	5 16	10 20	10 42	6 0	6 23
M	7	1 49	2 9	6 20	6 42	3 14	3 35	2 12	2 33	5 38	6 0	11 5	11 28	6 46	7 9
Tu	8	2 29	2 51	7 4	7 26	3 56	4 17	2 54	3 15	6 22	6 44	11 51	—	7 32	7 54
W	9	3 13	3 34	7 48	8 10	4 40	5 3	3 36	3 57	7 5	7 25	0 14	0 38	8 16	8 37
Th	10	3 56	4 19	8 32	8 55	5 26	5 49	4 20	4 44	7 45	8 6	1 3	1 28	8 58	9 19
F	11	4 41	5 4	9 19	9 44	6 14	6 39	5 8	5 34	8 28	8 50	1 53	2 19	9 40	10 1
S	12	5 28	5 53	10 9	10 37	7 6	7 36	6 2	6 32	9 12	9 35	2 45	3 11	10 22	10 46
S	13	6 21	6 51	11 12	11 51	8 10	8 47	7 5	7 42	10 1	10 33	3 39	4 9	11 14	11 49
M	14	7 25	8 3	—	0 33	9 29	10 14	8 23	9 5	11 10	11 50	4 41	5 17	—	0 29
Tu	15	8 44	9 28	1 13	1 53	10 54	11 34	9 48	10 28	—	0 33	5 53	6 33	1 9	1 51
W	16	10 11	10 50	2 30	3 4	—	0 10	11 3	11 34	1 17	1 57	7 10	7 45	2 31	3 7
Th	17	11 22	11 51	3 35	4 4	0 41	1 6	—	0 1	2 31	3 0	8 15	8 40	3 40	4 11
F	18	—	0 17	4 28	4 50	1 29	1 49	0 23	0 43	3 27	3 50	9 2	9 24	4 37	5 1
S	19	0 38	0 58	5 8	5 26	2 8	2 25	1 2	1 20	4 12	4 32	9 43	10 1	5 23	5 42
S	20	1 17	1 34	5 42	5 58	2 40	2 55	1 36	1 52	4 51	5 8	10 19	10 36	6 1	6 19
M	21	1 50	2 5	6 14	6 31	3 10	3 25	2 8	2 24	5 24	5 40	10 53	11 10	6 36	6 53
Tu	22	2 21	2 35	6 48	7 5	3 40	3 56	2 38	2 53	5 56	6 12	11 27	11 45	7 10	7 26
W	23	2 51	3 5	7 21	7 37	4 12	4 28	3 8	3 23	6 27	6 41	—	0 3	7 42	7 57
Th	24	3 21	3 37	7 52	8 7	4 44	5 0	3 39	3 55	6 55	7 9	0 20	0 38	8 12	8 27
F	25	3 54	4 11	8 23	8 40	5 17	5 34	4 11	4 29	7 23	7 38	0 56	1 14	8 43	9 0
S	26	4 28	4 44	8 58	9 17	5 53	6 13	4 47	5 7	7 54	8 11	1 33	1 53	9 17	9 34
S	27	5 1	5 20	9 37	9 58	6 33	6 54	5 28	5 51	8 28	8 46	2 13	2 34	9 51	10 9
M	28	5 40	6 4	10 21	10 50	7 19	7 49	6 16	6 44	9 6	9 31	2 56	3 20	10 29	10 54
Tu	29	6 31	7 0	11 24	—	8 21	8 59	7 16	7 53	10 0	10 35	3 47	4 16	11 22	11 57
W	30	7 32	8 10	0 3	0 41	9 39	10 20	8 31	9 13	11 13	11 57	4 47	5 22	—	0 34

Week Day.	Month Day.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Tu	1	5 22	6 10	6 1	6 44	11 29	—	5 25	6 7	2 43	3 26	10 27	11 14
W	2	6 57	7 37	7 28	8 8	0 13	0 54	6 47	7 24	4 4	4 37	11 56	—
Th	3	8 13	8 43	8 46	9 18	1 33	2 8	7 59	8 30	5 6	5 29	0 34	1 5
F	4	9 8	9 31	9 45	10 9	2 37	3 2	8 57	9 23	5 50	6 11	1 32	1 55
S	5	9 51	10 11	10 31	10 53	3 25	3 47	9 45	10 4	6 32	6 52	2 16	2 37
S	6	10 31	10 51	11 15	11 37	4 9	4 31	10 23	10 42	7 12	7 34	2 58	3 19
M	7	11 13	11 35	—	noon	4 53	5 15	11 2	11 23	7 56	8 16	3 40	4 1
Tu	8	11 57	—	0 23	0 46	5 38	6 1	11 45	—	8 36	8 56	4 22	4 43
W	9	0 20	0 43	1 9	1 32	6 24	6 46	0 8	0 31	9 16	9 37	5 5	5 27
Th	10	1 6	1 29	1 54	2 16	7 9	7 32	0 54	1 18	9 59	10 22	5 49	6 13
F	11	1 52	2 15	2 39	3 2	7 55	8 19	1 43	2 8	10 47	11 16	6 37	7 2
S	12	2 38	3 4	3 26	3 53	8 44	9 11	2 35	3 4	11 52	—	7 31	8 1
S	13	3 33	4 7	4 22	4 53	9 39	10 14	3 35	4 12	0 33	1 17	8 33	9 9
M	14	4 47	5 31	5 29	6 9	10 54	11 35	4 53	5 33	2 6	2 51	9 50	10 33
Tu	15	6 16	7 1	6 50	7 31	—	0 17	6 12	6 50	3 30	4 7	11 17	11 57
W	16	7 40	8 11	8 9	8 42	0 55	1 31	7 24	7 55	4 36	5 2	—	0 31
Th	17	8 38	9 2	9 12	9 38	2 2	2 29	8 24	8 50	5 24	5 44	0 59	1 25
F	18	9 23	9 42	10 0	10 21	2 52	3 15	9 13	9 35	6 3	6 22	1 47	2 7
S	19	9 59	10 15	10 40	10 58	3 34	3 52	9 54	10 9	6 40	6 57	2 24	2 40
S	20	10 31	10 47	11 16	11 33	4 10	4 27	10 24	10 38	7 14	7 30	2 56	3 12
M	21	11 3	11 19	11 50	—	4 43	4 59	10 53	11 8	7 46	8 1	3 28	3 44
Tu	22	11 35	11 51	0 7	0 24	5 15	5 32	11 23	11 38	8 16	8 31	4 0	4 16
W	23	—	0 7	0 40	0 56	5 49	6 5	11 54	—	8 45	8 59	4 32	4 47
Th	24	0 23	0 39	1 12	1 28	6 21	6 37	0 11	0 28	9 13	9 29	5 2	5 18
F	25	0 55	1 12	1 45	2 2	6 54	7 12	0 45	1 3	9 45	10 1	5 35	5 53
S	26	1 29	1 48	2 19	2 37	7 30	7 49	1 22	1 42	10 19	10 40	6 12	6 31
S	27	2 7	2 27	2 56	3 16	8 8	8 28	2 2	2 24	11 5	11 35	6 51	7 15
M	28	2 49	3 14	3 38	4 8	8 52	9 19	2 48	3 16	—	0 10	7 41	8 9
Tu	29	3 43	4 18	4 31	5 2	9 49	10 27	3 46	4 23	0 48	1 31	8 41	9 17
W	30	4 56	5 37	5 37	6 15	11 1	11 38	5 1	5 38	2 16	2 57	9 56	10 37

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 8	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 8	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 8	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 8	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 48	London
Oporto	−1 17	Brest
Ostende	+1 18	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 18	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 8	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 48	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS.)

592. John Lorimer Corbett and William Young Fleming. "Improvements in propelling and steering ships, and in apparatus or mechanism employed therefor."

598. Charles Henry Graham Smith. "Improved apparatus for shipping coal and other produce."

640. Christopher Hill. "Improvements in the construction of the bearing bars of the grates of marine and other boilers, and in the arrangement of firebars employed in connection therewith."

650. David Huston. "Improvements in and relating to ships' sleeping berths, which improvements are also applicable to other parts of ships and their furniture." (A communication.)

652. John Shaw. "Improvements in marine-engine telegraphic and indicating apparatus."

678. Frederick Whittaker Scott. "Improvements in arrangements for towing ships, vessels, or boats."

679. Sir William Thomson, Knight. "Improvements in the mariner's compass, and in appliances for correcting its errors."

710. James Pullar. "New or improved means or appliances to be used for clearing or removing the water from the interior of submerged vessels."

834. Anton Gareis. "Improvements in mechanism for the propulsion of boats and partly applicable for other like purposes." (A communication.)

835. Anton Gareis. "Improvements in the mariner's compass." (A communication.)

850. James Skinner. "Improvements in screw-propellers."

910. Daniel Henry Sisson. "Improvements in the means or apparatus employed for propelling steam vessels, such improvements being also applicable as an auxiliary means for imparting motion to sailing vessels."

922. Frederic Bradley and Ernest Latham. "Improvements

in gear for steering ships, and other bodies moved or propelled on water or land."

955. Charles Douglas Morton. "The preservation of iron or wooden ships, fortifications, armour plates, ordnance, also for submerged iron bodies."

964. Ewald Bellingrath. "A hydraulic apparatus for the uniform distribution of weights, forces, or resistances, especially applicable to carriages for the transport of ships and boats."

972. George Robert Shareman. "Improvements in the construction of boats which may be rolled or folded to facilitate their transport or carriage."

977. Alexander Morton. "Improvements in propelling vessels."

993. Adolphus Vogt and Augustus Figge. "Improvements in floating naval arsenals, docks, ship-raising platforms, and blocking apparatus."

994. George Guthrie. "Improvements in steering apparatus."

996. William Hughes. "Improvements in fog-signal compass."

1013. Thomas Edward Brigham. "Improvements in steam steering gear."

1028. Albert Charles Augustus Holzapfel. "Improvements in anti-fouling and preservative compositions for ships' bottoms and other submerged surfaces."

1031. Alexander Anderson. "Improved mechanical movement, applicable to steering gear and other purposes."

1034. Edward Smith. "Improvements in sea-going ships."

ABRIDGEMENTS.

2580. Wallace Bartley, Rainhill, Lancaster. "Improvements in and relating to watertight bulkhead doors, and in the method of and apparatus for actuating them." A sluice-valve door is suspended from a swivel which is supported in a recess in a spindle, a crank being attached to the spindle to which is fixed a lever with a float. The water raising the lever causes the spindle to turn, and the swivel slipping out of the recess allows the door to fall into its place. Hinged doors are made to spring naturally into the closed position. A bar is suspended from above the door turning on a pin and kept in, and released from, a horizontal position, in the same manner as the sluice-valve door; the bar on falling wedges its lower end into a recess

in the deck below the door. The doors may thus closed be instantly in the case of any sudden accident.

2602. Josiah Latimer Clark and John Standfield, Victoria Street, Westminster. "An improved grid for docking and raising vessels." The backbone of the grid is a hollow box girder, and the sides are in the form of short girders or ribs, projecting at right angles from the backbone and on the top of these ribs, sliding bilge blocks are constructed, side shoring frames being erected at their ends and the intermediate space between the ribs being planked over; hydraulic presses are placed directly under the centre of the grid and are inserted in the ground. The vessel being floated at high water over the grid, the rams as they ascend carry up the grid with the vessel upon it, and when it is at its highest level, it is supported there on struts or pawl legs, the rams then being lowered into the presses to prevent them from rusting.

2847. Joseph Allen Baker, Kingston, Ontario. "Improvements in and appertaining to propelling vessels and apparatus therefor." One or more pumps are placed at one end of the vessel, and either worked by engines directly behind them, or one rod may serve to carry the engine and pump pistons; the water is pumped from apertures in the vessel's bottom fitted with clock valves. From the pumps proceed four lateral curved pipes, two (one on each side) pointing ahead and two astern; at the stern a nozzle is placed, connected to the pumps, so as to eject a jet directly astern, and is capable of a lateral motion, being actuated by the steering wheel; the vessel may also be steered independently of the jet astern, by closing one pipe pointing ahead on one side and one astern on the other.

2888. William Francis Reynolds, Commercial Road East, Middlesex. "Improvements in ship's compasses, and in apparatus for finding the deviations thereof." A glass partition is fitted in a binnacle case so as to divide it into two parts, the upper part serving as the needle or card compartment, and the lower for the reception of a reflector by which a light is thrown upwards to light up the card. To the top of the binnacle compass is fitted an improved palinurus, consisting of an upright disc which carries a spindle on which, on one side of the disc, a pinion is mounted, and on the other side a pointer hand; a rock frame having a segmental

toothed rack upon it engages into the teeth of the pinion, and by setting the rock frame at an angle representing the declination of the heavenly body under observation, the instrument gives the deviation of the compass by means of the sun's shadow. Another part of this invention consists in suspending within a box, having a sloping top, a bent bar, to which the pivot point of the compass card is affixed, one end of which bar is carried up the back of the box, so that it serves as the lubbers' point. To be out of magnetic influence a compass is suspended by a rope high up between the two masts of a vessel. The compass is fitted with a long needle, below which is placed a smaller one upon a stem, supported by a spring plate acting as an armature to an electro-magnet, and is (by means of a magnet fixed to the stem carrying the upper needle) compelled to move in the same direction as the upper needle. The compass is in electrical connection with a compass dial on deck, to which, by means of a series of magnets and armatures, it communicates its true reading when required.

2928. Alfred William Birt, Dock Street, Middlesex. "Improvements in lifebuoys and in apparatus connected therewith." A wooden plank is covered on both sides with cork till it assumes the shape of a cylinder; these are connected together in pairs by metal rods, forming ladder-like structures. They are secured round the bulwarks of the ship by lashings, which are cut when required for use.

AMERICAN.

211301, 211302, 211303. John L. Lay. "Torpedo boats."

211474. Charles E. Marshall. "Anchors."

211587. Wilhelm Raydt. "Means for raising sunken vessels, &c."

BELGIAN.

47154. J. Kunstädter. "Improvements in apparatus and mountings for working and propelling ships."

CANADIAN.

9221. John Rourk. "Improvements in steamboats."

9245. William Pendrigh. "Improvements in ship side-lights."

GERMAN.

4677. P. Weinert. "A governor for marine engines."

4711. A. H. Reichelt. "A construction of screw steamers."

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
87	England—Thames Entrance — Tongue Light-vessel	Alteration in position.
88	„ Medway River	Anchorage for loading or discharging explosives.
89	„ East Coast—Leman and Ower Light	Intended alteration of light.
90	„ „ Whitby Rock	To be marked by bell-buoy.
91	Ireland— South-East Coast — Tuskar Rock Lighthouse	New rocket fog-signal.
92	North Sea—Ems River Entrance—Borkum Island	Lighthouse destroyed by fire, new temporary light.
93	„ Germany—Juist and Wangeroog Island	Proposed alteration of buoyage.
94	Baltic—Kiel Bay	Proposed alteration of buoyage.
95	Norway—West and South Coast	Proposed lights.
96	Mediterranean—Dardanelles and Bosporous	Re-exhibition of lights.
97	India—West Coast—Cutch Gulf—Toona Creek	New light.
98	„ „ Nowa-Nugga Creek —Roji Island	New light.
99	„ Bay of Bengal—Coringa Bay—Vakalapudi and Coconada	New light in new position; old light discontinued.
100	„ „ „ False Point Anchorage	Intended alteration of light.
101	„ „ „ Hooghly River—Eastern Channel Lightship	Not to be altered in position according to monsoon.
102	Eastern Archipelago— Java – Sunda Strait – Fourth Point	Additional light discontinued.
103	„ „ Java — Batavia Road	Discovery of shoal.
104	„ „ Madura Strait—Meinders Reef	New light.
105	Australia—Victoria—Port Philip	Buoys marking battery practice range.
106	„ Queensland — Capricorn Channel—North Reef	New light.
107	South Pacific.—Society Islands – Tahiti	Shoal in Papiete Channel.
108	United States—Gulf of Mexico—Texas —Brazos de Santiago	New light on Padre Island; old light discontinued.
109	„ South Carolina—Charleston Harbour	New bell-buoy.
110	„ Maryland—Chesapeake Bay—Hawkins Point	Alteration of light.
111	Canada—Nova Scotia—Sheet Rock, Sheet Harbour	New light.
112	„ Bay of Fundy—Musquash Harbour	New light.

NAUTICAL NOTICES.

87.—England.—*Thames River Entrance.—Princes Channel.—Alteration in Position of Tongue Light-vessel.*—This light-vessel has been moved 4 cables E.S.E. of her former position, and now lies in 10 fathoms at low-water spring tides, with the following marks and bearings, viz.:—Minster Mill, just open to the westward of the East cliff, Westgate bay, S. by W. ¼ W.; the Spire

on the Deaf and Dumb Asylum at Margate, in line with the tower of the Pavilion on the Jetty head, Margate, S. $\frac{1}{4}$ E. Ely; East Tongue buoy, S. $\frac{3}{4}$ W., distant $\frac{3}{10}$ths of a mile; North East Tongue buoy, W. $\frac{3}{4}$ N. Nly., distant $1\frac{9}{10}$ths mile; Princes channel light-vessel, W.N.W., distant $4\frac{2}{10}$ths miles; Shingles Spit buoy, N.W. by W. $\frac{1}{4}$ W., distant $2\frac{3}{10}$ths miles; Shingles beacon, N.W. $\frac{1}{2}$ W., distant $2\frac{2}{10}$ths miles; South East Shingles buoy, N. by W. $\frac{3}{4}$ W., distant $1\frac{1}{10}$th mile; Tongue Knoll buoy, E. $\frac{1}{2}$ S. Sly., distant 2 miles; North East Spit buoy, S.E. $\frac{1}{4}$ E., distant $3\frac{6}{10}$ths miles.

88.—ENGLAND.—*East Coast.—Medway River.—Anchorage for Loading or Discharging Explosives.*—The undermentioned buoys have been placed in Long and Gillingham reaches, to the eastward of which vessels are to moor while loading or discharging explosives. (1.) LONG REACH.—A *can* buoy, painted red, is moored between Bishops Ness and Bishops spit, in 21 feet at low-water spring tides, with the following bearings, viz.:—North tangent of Darnett Ness fort, W. by N. $\frac{1}{2}$ N.; Hoo church, N.W. by W.; Gillingham church, W. $\frac{1}{2}$ S. (2.) GILLINGHAM REACH.—A *can* buoy, painted red, is moored opposite Folly point, in 19 feet at low-water spring tides, with the following bearings, viz.:—Hoo church, N. by W.; Gillingham church, W. by S. $\frac{1}{4}$ S.; Friday mill, S. by W. $\frac{1}{2}$ W.

89.—ENGLAND.—*East Coast.—Intended Alteration in Leman and Ower Light.*—During the summer of 1879, the two lights will be discontinued, and instead thereof, *one white* light, showing *two flashes* in quick succession every *half minute*, will be exhibited. The light will be elevated 38 feet above the sea. Further notice will be given when the change has been effected.

90.—ENGLAND.—*East Coast.—Proposed Alteration in Character of Whitby Rock Buoy.*—In order better to mark the extremity of Whitby rock, a *bell buoy*, painted *black*, and surmounted by a *staff* and *globe*, will, in the course of the ensuing summer, be placed in the position now occupied by the Whitby rock buoy. Further notice will be issued.

91.—IRELAND.—*South-East Coast.—Fog-Signal at Tuskar Rock Lighthouse.*—On 20th February, 1879, a rocket fog-signal was established; during thick and foggy weather, a rocket which explodes

with a loud report on reaching the height of about 400 feet, will be discharged at intervals of *five minutes.*

Note.—The sounding of the fog-*bell* has been *discontinued*, but the bell will not be removed until the success of the rocket as a fog-signal has been proved.

92.—NORTH SEA.—*Ems River Entrance.—Temporary Light on Borkum Island.*—The exhibition of the usual light being interrupted through injury to the lighthouse by fire, a *fixed white* light was provisionally exhibited on Borkum island, on 17th February, 1879, which should be visible 10 miles.

93.—NORTH SEA.—*Germany.—Buoyage between Juist and Wangeroog Islands.*—It is proposed at an early date to make several alterations in the buoyage of the channels between these islands.

94.—BALTIC.—*Buoyage of Kiel Bay.*—It is proposed early in April to make considerable alterations in the buoys, and also to add to their number.

95.—NORWAY.—*West and South Coasts.—Proposed Lights.*—It is in contemplation to erect lighthouses on Vœrö (Lofoden), Kjeungskjær, and Hestskjær; a light may probably be shown in August from the lighthouse in course of construction on Lepsörev, and a lighthouse has been commenced on Ytterö island; the foregoing are on the west coast. It is also proposed in August to exhibit lights from the lighthouses in course of construction at Homborgsund and Lyngör on the south coast.

96.—MEDITERRANEAN.—*Dardanelles and Bosporus, Re-exhibition of Lights.*—With reference to Notice in 1877, on regulations for closing the navigation of the Dardanelles and the Bosporus at night, the lights in the Dardanelles and the Bosporus are re-exhibited.

97.—INDIA.—*West Coast.—Gulf of Cutch.—Light at Toona Creek Entrance.*—Exhibited on 5th September, 1878, from a lighthouse erected on the west side of Toona creek entrance, north shore of Gulf of Cutch; it is a *fixed white* light, elevated 17 feet above high water, and visible 6 miles. The lighthouse, 23 feet high, built of stone, is situated about three-quarters of a mile southward of Tekra islet, on the eastern edge of a low mangrove swamp, which covers at high tides. Position, lat. 22° 55′ 30″ N., long. 70° 7′ 10″ E.

98.—India.—*Gulf of Cutch.—Nowa-Nugga Creek.—Light on Roji Island.*—On the south shore of Gulf of Cutch; it is a *fixed white* light, elevated 42 feet above high water, and visible in clear weather between the bearings S.E. by E. ¼ E. and S.W. by W. ¼ W. from a distance of 7 miles. The lighthouse, 50 feet high, circular in shape and coloured white, is situated on the north-east point of Roji island, near the west corner of a temple. Position. lat. 22° 32′ 50″ N., long. 70° 1′ 30″ E. *Variation*, 1° *E.*

99.—India.—*Bay of Bengal.—Coringa Bay.—Light at Vakalapudi, and Discontinuance of Coconada Light.*—With reference to Notice 48, p. 181, the light at Vakalapudi was exhibited on 15th January. It is a *flashing white* light, showing a flash every *twenty seconds*, elevated 80 feet above high water, and visible 14 miles. The lighthouse is a white column, 76 feet high, situated seaward of the cocoa-nut trees, about 2½ cables from the shore, and $4\frac{6}{10}$ths milos N. by E. ⅞ E. of Coconada lighthouse. Position, lat. 17° 0′ 40″ N., long. 82° 16′ 30″ E.

Note.—The light is intended to lead clear of the shoal ground extending northward of Godavari (Gordeware) point. Vessels approaching Coconada road from the southward and eastward, should not shoal the water to less than 10 fathoms, until the light bears westward of W.N.W., when the anchorage may be steered for, and a berth taken up in about 5 fathoms. Coconada light is discontinued. *Variation*, 2° *E.*

100.—India.—*Bay of Bengal.—False Point Anchorage.—Intended Alteration in False Point Light.*—The light now exhibited being inefficient, it is intended shortly to replace it by a *fixed* light, visible 20 miles. Further notice, with particulars, will be given.

101.—India.—*Bay of Bengal.—Hooghly River Entrance.—Position of Eastern Channel Light-vessel.*—Inconvenience having been caused by shifting the Eastern channel light-vessel—according to the N.E. or S.W. monsoon—moorings have been laid down in 10½ fathoms at low water spring tides, at which the light-vessel is permanently placed. Position as given, lat. 21° 1′ 20″ N., long. 88° 13′ E.

102.—Eastern Archipelago.—*Java.—Sunda Strait.—Discon-*

tinuance of Additional Light at Fourth Point.—It used to indicate the direction (now altered) of the telegraph cable between Anjer and Telok Betong, and is discontinued.

103.—EASTERN ARCHIPELAGO.—*Java.*—*North Coast.*—*Shoal in the Fairway to Batavia Road.*—It bears N.E. by E. of Serassa rock, distant $1\frac{3}{10}$ths miles; it is 1 cable in extent, with 4 fathoms over it at low water, and lies with the following bearings, viz.:—East extreme of Parrie island, N. 41° ¾ W.; north-west extreme of Great Kombuys island, S. 63° ¼ W.; west extreme of Little Kombuys island, S. 28° ¾ W.

104.—EASTERN ARCHIPELAGO.—*Madura Strait.*—*Light on Meinders Reef.*—Established on 30th January, 1879; it is a *fixed* white light, visible 12 miles. Further particulars of this light will be given.

105.—AUSTRALIA.—*Victoria.*—*Port Phillip.*—*Buoys Marking Battery Practice Range at Williamstown.*—Three buoys, painted red, have been placed in an east and west direction, 3 cables apart, from the batteries at Williamstown. Vessels are cautioned not to come within these buoys whilst firing is going on. The eastern buoy is moored 2 cables from the shore.

106.—AUSTRALIA.—*Queensland.*—*Capricorn Channel.*—*Light on North Reef.*—Established on 14th November, 1878; it is a *fixed* and *flashing* light, showing *fixed* for *two minutes*, followed by *two flashes* in succession at an interval of *one minute*, the series of changes occupying *four minutes;* elevated 72 feet above high water, and visible about 13 miles. The lighthouse, 80 feet high and circular in shape, is painted white. Position, lat. 23° 10′ 50″ S., long. 151° 56′ 10″ E.

107.—SOUTH PACIFIC.—*Society Islands.*—*Shoal in Papiete Channel, Tahiti.*—A live coral head, with only 5 fathoms water over it, has been found in the entrance channel to Papiete harbour, where charts show 5½ to 6 fathoms.

108.—UNITED STATES.—*Gulf of Mexico.*—*Texas.*—*Light at Entrance to Brazos de Santiago.*—*Brazos Island temporary Beacon-Light Discontinued.*—A *fixed white* light, illuminating the entire horizon, is now shown from the lighthouse recently erected at the south end of the Padre island; elevation, 60 feet above mean low

water, and visible 13 miles. The structure is a hexagonal dwelling, on a screw-pile foundation; the foundation, roof, and lantern are painted black; the dwelling, slate colour. Approximate position, lat. 26° 4′ 38″ N., long. 97° 8′ 45″ W. Point Isabel lighthouse bears West 2½ miles. The light on Brazos island is now *discontinued*.

109.—UNITED STATES.—*South Carolina.—Bell on Buoy in Charleston Harbour.*—The nun buoy at the junction of the main, or Pumpkin hill, and the South channels, entrance to Charleston harbour, is now distinguished by a bell placed upon it. This bell will be rung by the motion of the waves, and may be heard at a sufficient distance from the buoy to enable vessels to use it as a turning-point.

110.—UNITED STATES.—*Maryland.—Chesapeake Bay.—Alteration in Hawkins' Point Light.*—This light, which serves as the upper beacon of the Brewerton channel range, near Baltimore, Patapsco river, now shows but *one fixed* light, instead of two as heretofore.

111.—CANADA.—*Nova Scotia.—Sheet Harbour.—Light on Sheet Rock.*—Exhibited on 15th February, 1879, from a lighthouse erected on Sheet rock, at the entrance of Sheet harbour; it is a *revolving red* light, attaining its greatest brilliancy every *forty seconds*, elevated 75 feet above high water, and visible from seaward in clear weather between the bearings N.W. ¾ W. and N.E. by E. ¾ E. from a distance of 10 miles. The lighthouse, 41 feet high, constructed of wood and painted white, is a square tower, with dwelling attached; it is situated a little westward of the centre of the rock. Position, lat. 44° 49′ 55″ N., 62° 29′ 40″ W.

112.—CANADA.—*Bay of Fundy.—Light at Musquash Harbour.*—Exhibited on 15th February, 1879, from a lighthouse recently erected on the east side of the entrance to Musquash harbour; it is a *fixed* light, showing *green* to seaward, and *white* in the direction of the harbour, elevated 112 feet above high water, and visible 10 miles. The lighthouse, 40 feet high, constructed of wood and painted white, is a square tower with dwelling attached. Position, lat. 45° 8′ 35″ N., long. 66° 14′ 30″ W.

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1879.

No. 1.—South Indian Ocean, Notice 15; information relating to Seychelle and Farquhar islands; also to port Robinson, Madagascar.

No. 2.—Australia Directory, Vol. II., Notice 27; additional information relating to Torres strait, and to the south-east coast of New Guinea.

No. 3.—Australia Directory, Vol. III., Notice 9; Torres strait, western entrance; information relating to Lucius reef and Aurora shoal.

Charts, &c., Published by the Hydrographic Office, Admiralty, in January and February, 1879.

1056	Australia, west coast:—Cape Cuvier to Champion bay, including Sharks bay—plans, Turtle bay and port Gregory	2	6
860	Africa, east coast:—Kisimayu bay	1	6
695	New Zealand:—Cook strait	3	0
884	Sea of Marmara:—Artaki bay	1	6
722	Seychelles islands:—Approaches to Bara chois or port Victoria, and plan of port	1	6
851	Mozambique channel:—Bassas da India and Europa island	1	6
849	Australia, south coast:—Sea mouth of Murray river, with enlarged plan of bar	1	6
842	Bay of Bengal, Malay peninsula:—Sayer islands and adjacent coast to Bass harbour, Malacca strait entrance, including Salang or Junkseylon island	2	6
845	Fiji islands:—Kandavu passage to Kowata island, including the Nandi waters	3	0
1825	A plan of Buckie harbour added.		
209	Plans of Malloo, Popau, Quahquahroo, and Qui harbours added.		
2885	Plans of Ensenada and Santo Tomas anchorage added.		
Ireland,	Sailing directions for the coast of, Part II., 2nd edition, 1878	3	6

OUR OFFICIAL LOG.

Official Inquiries at Home, 1878.

361. *Commissariat*, s.s.; iron; built at Whiteinch in 1870; owned by Mr. A. M. Davidson and others, of Newcastle; tonnage, 631; Shields to Swinemunde; coals; lost near the Skaw, December 6, 1878. Inquiry held at Newcastle, February 21, 1879, before Rothery, Wreck Commissioner; Powell and Nicolas, N.A. Casualty due to an error of judgment on the part of the master. Certificate returned.

368. *State of Louisiana*, s.s.; iron; built on the Clyde in 1872; owned by the State Ship Company; tonnage, 1,216; Glasgow to New York; general cargo, and passengers; lost on Hunter's Rock at the entrance of Larne Harbour, December 24, 1878. Inquiry held at Glasgow, January 16, 1879, before Baker and McCallum, J.P.; Hight and Forster, N.A. Casualty due to a strong tide setting the vessel on the rock, and the buoy on Hunter's Rock not being in position. Master's certificate returned.

370. *Debonair*, wood; built at Ardrossan, 1877; owned by Mr. L. Molloy and others, of Greenock; tonnage, 82; Bilbao to Glasgow; iron ore; stranded at White Hole, near Carnsore Point, December 29, 1878. Inquiry held at Wexford, January 16, 1879, before Ryan, J.P.; Knox and Wilson, N.A. Accident due to an error of judgment on the part of the master in mistaking Coningbeg light (which had been recently altered from a fixed to a flashing light) for the Tuskar. Certificate returned.

371. *King Arthur*, ship; built at West Hartlepool, 1861; owned by Mr. T. Harrison and others, of Liverpool; tonnage, 1,211; Charleston to Liverpool; cotton; lost in Bannow Bay, December 31, 1878. Inquiry held at Liverpool, January 30, 1879, before Rothery, Wreck Commissioner; Forster and Wilson, N.A. Master in default for steering in too close proximity to the land from the Old Head of Kinsale. Certificate suspended for six months, and recommended for one as mate during that period.

372. *Mesopotamia*, s.s.; iron; built at Renfrew, 1871; owned by Mr. T. K. Lynch, of London; tonnage, 765; London to Bussorah; general cargo (of which part consisted of iron) and five passengers; lost on the Coast of Portugal, December 18, 1878, when eight of her crew were drowned. Inquiry held at Westminster, February 7, 1879, before Rothery, Wreck Commissioner; Aplin and Hight, N.A. The casualty was due to the master navigating his vessel at too great speed in foggy weather, and not taking precautions to ascertain whether his compasses were affected by the iron cargo. The owners were also held to blame for sending the ship to sea with so large a quantity of iron on board without making any provision for its effect on the compasses. Master's certificate suspended for three months, and recommended for one as mate.

373. *Princess Royal*, schooner; built at Gainsborough, 1841; owned by H. J. Harrison, Kingston-on-Hull; tonnage, 106; London to Queenstown; cement; lost at the entrance of Queenstown Harbour, December 25, 1878, with all hands. Inquiry held at Queenstown, February 15, 1879, before Starkie, J.P.; Grant and Curling, N.A. Loss of life due to the lifeboat not having reached the vessel through the default of the coxswain, and the intoxicated and otherwise inefficient state of the crew.

375. *James H. Myrick*, barque; built at Campbeltown, Prince Edward Island, 1877; owned by Mr. J. A. Matheson of that place; tonnage 399; Prince Edward Island to Queenstown; oats; abandoned at sea, January 1, 1879. Inquiry held at Liverpool, January 30, 1879, before Rothery, Wreck Commissioner; Forster and Wilson, N.A. Abandonment unjustifiable, as if proper measures had been taken the vessel could have been brought in port. Master's certificate suspended for twelve months, and mate's for six months, and recommended for certificates during those periods as first and second mates respectively.

377. *Sarah and Emma*, barque; built at Liverpool, 1860; owned by C. Pierce, of Bangor; tonnage, 1,097; Rangoon to England; rice, cotton, &c.; damaged by the cutting away of the masts in Ballyteige Bay, December 31, 1878. Inquiry held at Liverpool, January 31, 1879, before Rothery, Wreck Com-

missioner; Forster and Wilson, N.A. Master justified in cutting away masts when obliged to anchor, but committed error of judgment in steering the courses he did. Certificate returned with a caution.

378. *Schiehallion*, barque; built at Dundee, 1869; owned by Mr. W. Savill and others; tonnage, 602; Auckland to London; lost near Blackgang Chine, Isle of Wight, January 13, 1879. Inquiry held at Westminster, February 5, 1879, before Rothery, Wreck Commissioner; Aplin and Curling N.A. Master to blame for not taking steps to verify his position, and for not using the lead. Certificate suspended for six months.

379. *Linguist*, ship; built at Sunderland, 1874; owned by Mr. Thos. Harrison and others, of Liverpool; tonnage, 1,534; Liverpool to a port in the East; salt; foundered off Cape Clear, January 11, 1879. Inquiry held at Liverpool, before Raffles, Stip. Mag.; Forster and Wilson, N.A. Casualty caused by certain spars breaking adrift on deck which stove in the coamings of the main hatchway, and from shipping large quantities of water which caused her to heel over on her beam ends and eventually founder.

381. *Union*, iron ship; built at Whiteinch, 1859; owned by Mr. W. Gunn, of Granton; tonnage, 188; damaged by an explosion of coal gas, January 12, 1879. Inquiry held at Newcastle, February 20, 1879, before Rothery, Wreck Commissioner; Powell and Nicolas, N.A. Explosion caused by an entire want of ventilation through the hatches being battened down, and by the cook striking a match in the lazarette.

382. *Norman*, s.s.; built at Sunderland, 1877; owned by Mr. H. Clapham and others, of Newcastle; tonnage, 583; St. Nazaire to Newport; ballast; lost on Etoce Rock, off Penmarch, Coast of France, January 13, 1879. Inquiry held at South Shields, January 31, 1879, before Yorke, Stip. Mag.; Holt and Beasley, N.A. Master exonerated from blame.

383. *Loch Sunart;* iron; built at Glasgow, 1878; owned by James Aitken and others; tonnage, 1,231; Glasgow to Melbourne; general cargo; lost on Skulmartin Rock, January 11, 1879. Inquiry held at Glasgow, February 10, 1879, before Cowan and

Kennedy, J.P.; Powell and Ward, N.A. Master in default in not using the lead, and for leaving the deck without leaving an officer in charge. Certificate suspended for nine months. Mate also to blame for not reporting Skulmartin Perch. Certificate suspended for three months.

384. *General Caulfield*, barque; built on the Tyne in 1859; owned by Smith & Co., North Shields; tonnage, 646; New York to Queenstown; wheat; lost in Courtmacsherry Bay, January 12, 1879. Inquiry held at South Shields, February 5, 1879, before Yorke, Stip. Mag.; Holt and Beasley, N.A. Master exonerated from blame.

386. *Savannah*, barque; built at Bath, State of Maine, 1864; tonnage, 786; Shields to Marseilles; coals; lost near Beauduc, Coast of France, January 4, 1879. Inquiry held at Newcastle, February 17, 1879, before Rothery, Wreck Commissioner; Powell and Nicolas, N.A. Master to blame for mistaking the fixed light at Faraman for the revolving one at Planier, and for not having supplied himself with reliable charts. Certificate suspended for six months. Mate also blameworthy, but certificate not dealt with.

387. *H. A. Brightman*, s.s.; iron; built on the Tyne, 1869; owned by Mr. Thos. Sutton and another; tonnage, 850; Tyne to Alexandria; coals; stranded near Staithes, and afterwards foundered, January 17, 1879. Inquiry held at South Shields, February 11, 1879, before Yorke, Stip. Mag.; Holt and Beasley, N.A. Master found in default for careless navigation. Certificate suspended for twelve months.

389. *Cleopas*, barque; built at Sunderland, 1869; owned by Mr. H. Darling and others; tonnage, 345; Liverpool to Tyne; salt; lost on Barnard Sand, North Sea, January 13, 1879. Inquiry held at Newcastle, February 15, 1879, before Rothery, Wreck Commissioner; Powell and Nicolas, N.A. Mate and second mate in default for not reporting the state of the weather to the master, and also for allowing the vessel to run to windward of her course. Neither of these officers held certificates of competency.

390. *Hellespont*, s.s.; iron; built at Middlesboro', 1873; owned by Messrs. Young and others, of Cardiff; tonnage, 859; Cardiff to Port Said; coals; abandoned off Cape Finisterre,

January 9, 1879. Inquiry held at Cardiff, February 14, 1879, before Jones, Stip. Mag.; Aplin and Castle, N.A. Casualty due to stress of weather, and no blame attached to master or officers.

391. *David Malcolm*, barque; built at Moulmein, 1839; owned by Mr. J. S. Rogers and the master; tonnage, 509; Tyne to Motril; coals; stranded on Whitby Rock, January 17, 1879. Inquiry held at Newcastle, February 19, 1879, before Rothery, Wreck Commissioner; Powell and Nicolas, N.A. Casualty caused by the master not setting proper courses, and neglecting to use the lead, also for remaining below under the influence of liquor when the state of the weather should have caused him to attend to the safety of his ship. The mate also to blame for neglecting to remain on deck during his watch, and for being intoxicated. Master's and mate's certificates each suspended for twelve months.

392. *Hagar;* wood; built at Chester, 1857; owned by Mr. D. Daniel; tonnage, 122; London to Brest; guano; lost on the Porsal Rock, Coast of France, January 20, 1879. Inquiry held at Liverpool, February 13, 1879, before Raffles, Stip. Mag.; Forster and Wilson, N.A. Casualty due to the vessel having been navigated with an insufficient chart. Master's certificate returned.

393. *Annie*, brigantine; built at Salcombe, county of Devon, 1867; owned by Mr. R. H. Sladen and others; tonnage, 242; Bahia to Queenstown; sugar; lost on Salcombe Bar, January 16, 1879. Inquiry held at Plymouth, February 14, 1879, before James, Jackson and Moore, Justices; Pickard and Hight, N.A. Master in default. Certificate suspended for three months.

393. *Corcyra*, s.s.; iron; built in 1862; owned by Messrs. Murphy and others of Dublin; tonnage, 494; Glasgow to Cardiff; ballast; stranded on the Horse Rock, Ramsay Sound, January 19, 1879. Inquiry held at Swansea, February 10, 1879, before Fowler, Stip. Mag.; Pickard and Jones, N.A. Master was held to be to blame and was censured.

394. *Helen*, barque; built in the United States, 1857; owned by Messrs. Cookson, of Liverpool; tonnage, 239; Liverpool to West Coast of Africa; general cargo; stranded off Rosslare, Wexford, January 21, 1879. Inquiry held at Liverpool, February 22, 1879, before Raffles, Stip. Mag.; Forster and Wilson, N.A.

Master to blame for careless navigation. Certificate suspended for nine months.

396. *Urbino*, s.s.; iron; built on the Tyne, 1871; owned by Messrs. Wilson, of Hull; tonnage, 1,229; Hamburgh to Cadiz; general cargo; lost on Galera Rock, Cadiz Bay, January 9, 1879. Inquiry held at Hull, February 26, 1879, before Rothery, Wreck Commissioner; Visconti and Castle, N.A. Casualty due to the master having approached too near to the entrance of Cadiz Bay, being misled by the absence of the buoys marking the shoals. Certificate returned.

397. *Day Star*, barque; built at Sunderland, 1863; owned by Mr. T. Anderson and others; tonnage, 321; New Orleans to Liverpool; oil-cake; stranded in Crookhaven Harbour, January 10, 1879. Inquiry held at Liverpool, February 19, 1879, before Raffles, Stip. Mag.; Forster and Wilson, N.A. Master free from blame. Certificate returned.

Cherbourg, s.s., and *Alice Davies;* the former iron; built at Dalmuir, 1875; owned by the Cunard Company; tonnage, 1,037; Liverpool to the Mediterranean; general cargo. The latter a barque, built at Liverpool, 1868; owned by Mr. J. Jones and others; tonnage, 590; Liverpool to Adelaide; general cargo; in collision in the Mersey, November 21, 1878, when five lives were lost. Inquiry held at Liverpool, February 8, 1879, before Raffles, Stip. Mag.; Grant and Wilson, N.A. Mate of *Cherbourg* to blame for keeping an insufficient look-out. Certificate suspended for three months. All other certificates returned.

398. *Edith Owen*, s.s.; iron; built at Wellington Quay, 1864; tonnage, 379; Bristol to Liverpool; general cargo; stranded and sunk on Coal Rock, near the Skerries, January 27, 1879. Inquiry held at Liverpool, February 14, 1879, before Raffles, Stip. Mag.; Forster and Wilson, N.A. Casualty caused by the fault of the mate in altering the course too soon. Certificate suspended for six months.

400. *Thomas E. Kenney*, ship; built at Maitland, N.S., 1877; owned by Mr. A. Putnam and others; tonnage, 1,558; New York to London; grain; abandoned at sea, January 19, 1879. Inquiry held at Liverpool, February 28, 1879, before Raffles, Stip. Mag.;

Grant and Hight, N.A. Master quite justified in abandoning the vessel. Certificate returned.

401. *Margaret;* wood; built at Sunderland, 1862; owned by Mr. J. Bedlington and others; tonnage, 285; Boulogne to West Hartlepool; coprolite; stranded on the Goodwin Sands, February 1, 1879. Inquiry held at Middlesboro', February 19, 1879, before Coleman, Stip. Mag.; Visconti and Jones, N.A. Casualty caused by the mate not keeping safe and proper courses whilst in charge, and neglecting to use the lead. Certificate suspended for three months.

402. *Titania*, brigantine; built at Bridport, 1873; owned by Messrs. C. T. and J. Bowring, of Liverpool; tonnage, 265; lost on North Rock, Co. Down, February 2, 1879. Inquiry held at Liverpool, February 27, 1879, before Raffles, Stip. Mag.; Grant and Hight, N.A. Master to blame for careless navigation. Certificate suspended for six months.

404. *Fidelia;* wood; built at St. John, N.B., 1868; owned by Mr. G. Eaton; tonnage, 450; New York to Liverpool; petroleum; deck-house washed away and other damage at sea, when three men were drowned. Inquiry held at Liverpool, March 5, 1879, before Raffles, Stip. Mag.; Harris and Powell, N.A. Casualty caused by having shipped a tremendous sea over the bows, which carried away the deck-house and all in it. Master deserved much credit for bringing his vessel into port.

407. *Shields* and *Charles W. Anderson*, s.s.; the former a brig; built of wood at Blythe, 1856; owned by Mr. G. R. Sutton; tonnage, 165; Newport to Cork; coals. The latter built on the Tyne, 1872; owned by Edwards and Co.; in collision in the Bristol Channel, February 15, 1879, whereby the brig was sunk and loss of life ensued. Inquiry held at Cardiff, February 26, 1879, before Jones, Stip. Mag.; Aplin and Parfitt, N.A. Accident caused by the wrongful and unseamanlike conduct of the master of the steamer in starboarding his helm and endeavouring to cross the bows of a vessel at anchor in a very strong tideway. Certificate suspended for twelve months.

409. *Caldera*, barque; built at Sunderland, 1858; owned by Mr. J. Coulson and others; tonnage, 714; Shields to Leghorn;

coals; stranded on Ridge Sand, February 13, 1879. Inquiry held at Westminster, March 4, 1879, before Rothery, Wreck Commissioner; Holt and Parfitt, N.A. Master in default for having kept his vessel too long on a course which would inevitably land her on the Ridge. Certificate suspended for three months.

Official Inquiries Abroad.

Wanganui, schooner; lost to the north of Oamaru, October 4, 1878. Inquiry held at Otago, October 10, 1878. Master to blame. Certificate suspended for four months.

Salve, brigantine; beached in Flinders Bay, October 25, 1878. Inquiry held at Vasse, Western Australia. Master justified in beaching his vessel.

Enterprise, s.t., and *Alexandra*, ship; in collision in Garden Reach, River Hooghly, November 6, 1878. Inquiry held at Calcutta. Evidence contradictory. Pilot of *Great Victoria* in tow of *Enterprise* to blame.

King Oscar, barque; stranded on Tory Shoal, Kaipaca Heads, October 5, 1878. Inquiry held at Auckland, N.Z., November 12, 1878. Casualty due to an error of judgment.

Felixstowe, barque; lost at Otaki, N.Z., October 13, 1878. Inquiry held at Wellington, November 13, 1878. Master and mate both drowned. No evidence to show upon whom the blame was attached.

Carlota, barque; lost on Pencarron Head, November 9, 1878. Inquiry held at Wellington, N.Z., November 13, 1878. No blame attributable to master.

Taupo, s.s.; grounded on reef off Maran Point, November 2, 1878. Inquiry held at Wellington, November 14, 1878. Master to blame. His certificate as well as mate's, suspended for six months. Second mate reprimanded.

Huon Belle, ketch; stranded on the North Spit of the Patea River, and also in the Manawatee River, September 10, and October 5, 1878, respectively. No decision.

J. G. Coleson, schooner; stranded on Cape Stephens, October

10, 1878. Inquiry held at Wellington, November 30, 1878. Master free from blame.

Dairymaid, s.s.; stranded on Collins' Reef near Bulli, October 30, 1878. Inquiry held at Sydney, December 2. Mate to blame, but held no certificate. Master cautioned.

City of Auckland, ship; lost at the mouth of the Otaki River, October 22, 1878. Inquiry held at Wellington, December 9, 1878. Master held to be in fault, but was in no way punished in consequence of previous good conduct and meritorious conduct in saving his passengers, &c.

Thalia, barque; abandoned at sea, November 18, 1878. Naval Court held at Valparaiso, December 20, 1878. Casualty due to dereliction of duty on the part of the second mate. Certificate suspended for three months.

Ada, barque; stranded at Chefoo, December 10, 1878. Naval Court held at Chefoo, December 20, 1878. Master found in default. Certificate suspended for nine months.

Macquarie, brigantine; lost in Sharks Bay, November 14, 1878. Inquiry held at Geraldton, December 21, 1878. Master free from blame.

Kate Irving, barque; stranded on Tony Rock Bar, December 17, 1878. Inquiry held at Nassau, December 26, 1878. Master free from blame.

Madura, s.s., and *Emerald*, brig; in collision at sea, April 10, 1877. Inquiry held at Madras, December 31, 1877. Casualty due to the incompetency of the Nacoda of the *Emerald*, but held no certificate with which the Court could deal.

Lady Hulse, ship; stranded in the Bay of Callao, December 10, 1878. Naval Court held at Callao, January 2, 1879. Some blame due to master. Severely reprimanded.

Laurestina, s.s.; lost on the Kopparstenarne Reef, December 30, 1878. Naval Court held at Stockholm, January 13, 1879. Master held responsible. Certificate suspended for three months.

Vortigern, s.s.; lost at Ras Aduleh, 30 miles from Cape Guardafui, December 24, 1878. Inquiry held at Aden, January 29, 1879. Master to blame. Certificate suspended for three months.

Adriatic, ship; lost off Gravelines, February 16, 1879. Inquiry held at Dunkirk, February 21, 1879. Master exonerated from blame.

Alpha, s.s.; lost in the Black Sea through collision with a transport. Naval Court held at Constantinople. Master severely reprimanded, and admonished to be more careful in future.

GENERAL.

ROCKET APPARATUS SERVICE.

Prawle, 29th December, 1878.—The *Utility*, of Fleetwood, from Fleetwood to Runcorn, when beating down Channel in thick weather came ashore here. Her crew, five in number, were rescued by the coastguard and volunteers with the rocket apparatus, but with much difficulty and at considerable risk, as, owing to the rocky character of the beach, they had to work the apparatus up to their necks in water, in order to prevent the crew from being dashed to pieces on landing.

Kilmore, 30th December, 1878.—The *Debonair*, of Greenock, from Bilbao to Glasgow, stranded at White Hole. Her crew were all saved; one by the rocket apparatus, and the rest, four in number, by remaining on board till the tide receded, when they were assisted ashore by the rocket party.

Bar of Lough, 31st December, 1878.—The barque *King Arthur*, of Liverpool, from Charlestown to Liverpool, stranded at Ballymadder. Her crew, consisting of twenty persons, were all saved; seven by the ship's boats, with the aid of persons on the beach, and thirteen by the rocket apparatus.

Wyke, 8th January, 1879.—The smack *Speedy*, of Jersey, was driven ashore inside the Chesil Beach, near this station. Her crew, three in number, were rescued by means of the rocket apparatus.

Dymchurch, 8th January, 1879.—The schooner *Marie Louise*, of Norway, owing to stress of weather, stranded here this evening. The coastguard and volunteers were soon on the spot with the rocket apparatus, but were unable for some time to effect any communication with those on board owing to the distance of the

vessel from the shore, but on her drifting nearer the shore with the tide, communication was effected, but the crew were so exhausted and benumbed that they could not use the apparatus. The coastguard then launched the station boat, and, with great difficulty and risk to their lives, succeeded in taking off the master and four of the crew, but another of the crew who had been lashed to the rigging, was found dead from exposure.

St. Catharine's Point, 13th January, 1879.—The barque *Schiehallion*, of London, came ashore in a thick fog near Black Gang Chine. She had on board a crew of sixteen hands and thirteen passengers. The greater number of the crew and passengers had succeeded in landing by means of lines from the ship, before the rocket party arrived, but two were unfortunately drowned, one in attempting to land and the other by being washed off the deck. The remainder, consisting of four passengers and two of the crew, were landed by the rocket apparatus.

Rosslare Coastguard Station, 21st January, 1879.—The barque *Helen*, of Liverpool, was reported at 8.30 p.m. as making signals of distress about a quarter-of-a-mile from this station. The rocket apparatus was immediately taken to her assistance, and a rocket line was thrown over the vessel, but the crew did not avail themselves of it. The large service coastguard boat, manned by the chief officer of coastguard, and two coastguard men, and seven Royal Naval Reserve men, was then launched, and, notwithstanding a heavy broken sea and strong wind, succeeded in taking off all the crew, twelve in number, and landing them in safety. One of the ship's boats was stove in and another sunk alongside shortly after.

Swanage, 24th January, 1879.—The Norwegian barque *Anne Margarethe*, bound from Rouen to the United States, was observed on shore by the chief officer of coastguard at this station. The rocket apparatus was at once got out and taken as near to the wreck as the nature of the ground would permit, and the coastguard, by going to the end of a jutting rock, succeeded in throwing over the ship a line with life-line and buoy attached, and by this means took off all who remained on board, viz., the master and five of the crew. The rest of the crew, together with the master's daughter, had landed in the ship's boat some time earlier.

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THE ELECTRIC LIGHT AS ADAPTED FOR MARITIME PURPOSES.

THE British public have recently been awakened to the fact that electricity as a light-giving power is on the eve of being made practically serviceable for domestic and other purposes. To many of us it seems but a short time since gas was an innovation, and the application of mineral oils for lighting purposes is of still more recent date. But if the sanguine anticipations which have of late been so frequently expressed should be realised, the electric luminary will ere long enlighten our streets and public buildings, and may even supersede gas, oil, and candles in the illumination of our homes.

That there is a great future in store for the electric light, no one can doubt. But in the present stage of its development it is impossible to form any idea of the probable extent of its future application. Our knowledge of the principles of electric energy, though far in advance of what it was only a few years since, is still limited; we possess the magic lamp of Aladdin, we know also how to rub it, but the spirit who answers to our summons is a mysterious being, the extent of whose power is unknown, and who comes from we know not where.

To this all-pervading power the mariner has long been indebted. The occult influence which causes the needle of the compass to assume a certain position in relation to the earth's poles, has enabled the seaman to traverse unknown waters in safety, and has guided him, voyage after voyage, from port to port, in storm and calm, across a trackless surface.

And now again this subtle power, manifesting itself in the form of light, shines with startling brilliancy from several of our lighthouses, thus further assisting the mariner to steer his vessel safely through the intricacies of our coast navigation.

There are three lighthouse stations on the coast of England which are now illuminated by means of electricity, viz., Souter Point, at the entrance of the River Tyne; the South Foreland near Dover (two lighthouses); and the Lizard on the Cornish Coast (also two lighthouses). In France there are two lighthouse stations exhibiting the electric light; in Russia one (Odessa), and there is one at Port Said at the entrance of the Suez Canal. It is a remarkable fact that America, the home of the inventor and new "notions," has not a single electric light on her extensive seaboard. There is, however, little doubt, now the merits and applicability of this light are made so public, that before long a considerable augmentation of this number of electric lights will be made in all parts of the world. It cannot fail to be gratifying to Englishmen to know that our country has been the pioneer in the use of this light for lighthouses, and that as early as 1857 and 1858 the Trinity House, with the aid of Faraday and Holmes, were making experimental trials which resulted in the establishment of the electric light at Dungeness on 31st January, 1862. Nearly two years later France followed our example and instituted electricity at the lighthouses at La Hève, and subsequently at Cape Grisnez.

For lighthouse purposes the electric light appears to be in the main well adapted. The difficulties necessarily attendant at the outset upon maintaining an illuminating agent of this novel and, we may add, apparently capricious character, appear to have now been in great measure overcome, for from records recently made public we learn that it is a very rare occurrence for the lights to fail and

that the machinery works with great regularity and efficiency. As regards cost, it appears that at present the expense of the electric light is considerably greater than that of the best oil or gas light, but it must of course be borne in mind that the former yields a much more powerful light, and, taking this element into consideration, that the increase in the power of light obtained from electricity is much greater than the relative increase in cost. The question now naturally suggests itself, to what extent is this increased cost justified by increased benefit to the mariner? In the case of two lights, one electric the other oil, both having equal elevations, the rays of both will reach the horizon in clear weather with nearly equal effect, and the mariner at the extreme range will sight one light as soon as the other. But the electric beam possesses one important advantage whereby its range is practically extended beyond the horizon. The intensity of the beam is so great, and has so much illuminating power, that a sort of glare in the atmosphere is produced, whereby the mariner is enabled to make the "loom" of the light for some time before the light itself is visible above the horizon. This property, which the most powerful oil light does not possess to anything like the same extent, undoubtedly tells greatly in favour of the electric light, and makes it especially suitable for those prominent headlands which serve as landfalls for the navigator coming from over sea.

As regards distinctiveness, it may be said that the intensity of the electric light makes it particularly well adapted for distinctions produced by flashes and occultations. The flashes themselves may be so clearly defined and the contrast of succeeding dark intervals so strikingly marked that the distinctiveness required is effected in an unmistakable manner. It is also well suited for the introduction of coloured sectors for indicating special dangers, &c., the light being very efficacious for making the cuts sharp and distinct.

Moreover, in itself the colour and intensity of the electric beam furnish it with a distinctive character, and enable it to be readily recognised in clear weather. We say advisedly in clear weather, because there appears to be some divergence of opinion as to the comparative effects of oil, gas, and electric lights when the atmos-

phere through which the light has to travel is hazy, misty or foggy. The friends of electricity claim that when the atmosphere is in such a condition that the best possible oil or gas light cannot penetrate to a greater distance than say 2 miles, the best electric beam which can be produced will pierce the obstructing medium to probably twice the distance, and relatively in proportion to the thickness of the fog or mist. It has also been asserted with reference to the electric light that when, on account of thick weather the light itself is invisible, the fog is within certain limits rendered luminous near to the path of the beam, which luminosity may under some conditions be made serviceable by the mariner. On the other hand, as regards the question of the penetrating power of the electric light in foggy weather, it is said that being, in comparison with the light produced from gas or oil, deficient in red rays, the passage of which is not nearly so much obstructed by aqueous vapour as is the passage of yellow, green, violet, and blue rays, in which the electric light is especially rich, the fog cuts off a much larger percentage of the luminous rays from the electric light than of those from oil or gas lights. A very high authority has, however, rejoined to this, that the electric light is so rich in light of all colours that it embraces all the rays emitted by oil or gas light, and that it is not by any means deficient in red rays. This statement casts doubt on the accuracy of the premises from which the alleged inferiority of the electric light in foggy weather is deduced, but the point is a crucial one, and ought to be definitively determined by experiment and observation. We take this opportunity of asking those of our readers who have opportunities of observing the electric lights, to note their behaviour in thick weather, and to furnish us with the results obtained, in order that we may record the practical experiences. There is one other point to which allusion may be made in our brief summary of this subject, viz., that it does not appear desirable to place an electric light on a low outstretching point of land, especially when, as in the case at Dungeness, vessels are in the habit of navigating close to the point. The electric light no longer is shown at Dungeness, and it is understood that the chief

reason for its withdrawal was that masters of vessels and pilots experienced great difficulty in judging their distance from the point, and that the light being at a low elevation was too much in the eyes of those approaching the point, preventing their seeing distinctly the lights of other vessels ahead and to some extent dazzling their sight. These objections if well founded were sufficiently serious to justify the change back to oil which was made a few years ago, but fortunately they do not exist when the light is placed at a high elevation as at the South Foreland, Lizard or Souter Points.

It is not too much to say that for lighthouses electricity furnishes a glorious illuminating agent, and it may be predicted with some certainty that as experience shows how the means of producing the light may be simplified and the cost reduced, its application will be considerably more extensive than it now is. As regards the English lighthouses, the Trinity House authorities, with the aid of their scientific adviser, Dr. Tyndall, and their engineer, Mr. James N. Douglass, are not at all likely to be behind other nations, and will, no doubt, continue to hold their position in the van of progress in regard to this splendid luminary.

But it is well now to enquire whether this is the only manner in which the electric light may be employed for maritime purposes. It is plain that our naval and military authorities are not of this opinion. The introduction of torpedo warfare has necessitated a training of watchfulness and the development of means for the detection of those engaged in laying the mines. With this primary object in view, experiments have been carried on with a powerful electric light, and some results obtained so interesting, that we think the following extracts, from a paper on the subject read before the Royal United Service Institution, in April, 1876, by Captain W. de W. Abney, R.E., F.R.S., are well worthy of being put before our readers:—

"It may be useful to point out the conditions under which an illuminated area of land or sea can be most favourably watched. It is a matter of remark that most people naturally choose a position close to the source of light, imagining that somehow they thereby observe with an increased intensity of beam. This is a

serious error, and one to be avoided. An observer (excepting in an unusual state of the atmosphere), should always stand away from the source of light. The most favourable position is naturally as close to the area as possible, but also nearly at an angle of 60° with the axis of the beam. An elevation of position is also a desideratum, for then full advantage of its depth as well as its breadth is obtained. The reason why a position at an angle with the axis of the beam is desirable is this, that where light is emitted from a point, the whole of the small particles of dust and vapour existing in the air (and which lie in its path) are strongly illuminated and reflect back light to the eye. The mistier the weather, the stronger the reflection will be. Throwing the beam of the electric light in the air of this room, its track is very perceptible to all. When we allow a little smoke to ascend through the rays the reflection becomes much strengthened. The particles of a mist, or of steam, will evidently reflect much of the light, and there will be a consequent absorption and diminution of intensity after passing through an atmosphere charged with either. When standing near the lamp, the eye has to receive the illuminations of all those particles between it and the object, and if the latter be half a mile off, it can well be conceived that the effect is dazzling. Besides which, the eye cannot distinguish an intensity differing less then $\frac{1}{64}$th part. It might, therefore, happen that the light from the object and the particles would come within that limit.

"When, however, the observer occupies the position indicated, it will be found that by taking the value of the light thrown back from the object and that from the reflecting particles, he obtains the maximum of distinctness of view. Though having a general knowledge of the effect of particles in the air when in the path of a beam, my attention was not particularly called to the subject till lately, when I attended some trials of different lights at Portsmouth. Boats were sent out whose supposed mission it was to grope for torpedo cables, and to cut them, in order to render submarine mines ineffective. On shore and in guard-boats observers were stationed to discover their approach. It was nearly invariably the case, I believe, that parties who occupied positions well out of the path of the light were the first to distinguish them, and generally

it was some considerable time after, before those who were near the lamp could discern them.

"As regards the attack on torpedo positions from the sea, it would be almost impossible to employ steam launches, as the white steam is always lighted up at very long distances, leading to the discovery of their whereabouts at once. Vessels may be constructed in which any escape of steam or smoke may be prevented, but at present such are rare. As a rule, I take it that ordinary boats, propelled by oars, will be employed.

"From a position near the light, a black boat would naturally escape detection, but the faces of the rowers and the splash of the aërated water thrown up by the oars would be very readily distinguished. Probably a crew with blackened faces and hands, using muffled black oars, might hope to approach unobserved from such a position, but from a point nearly at right angles to the beam, the illumination of the water would cause even a black object to stand out, particularly as a dark shadow must be cast by it."

There is also another point of some importance, viz., that an observer placed in the path of the beam some distance from the light is enabled to see for some considerable distance what is going on beyond him, but cannot make out anything between himself and the light. For example, in an experiment made, three boats were placed in a line, No. 1 at 600, No. 2 at 1,200, and No. 3 at 1,800 yards distance respectively from the light, and the beam was thrown along the line. The result was that observers near the light saw all three boats, that No. 1 boat saw Nos. 2 and 3, that No. 2 saw No. 3 but not No. 1, and that No. 3 could not see either No. 1 or No. 2, but could distinguish sailing vessels at a considerable distance to seaward.

On board many of H.M. ships the electric light is now established. The motive power necessary to drive the machines is at hand, and the light may be made available for side and masthead lights, for illuminating purposes below, and, if necessary, for watching the operations of an enemy, or for lighting the way in unknown waters. For these purposes it has quite recently been found possible to obtain two powerful lights from one machine and one engine. The range commanded by one light is generally not

more than half the horizon, but with the improvement now referred to the light may be with great ease projected in all directions, thus enabling the waters all round to be brought under observation.

A year or two ago Messrs. Sautter, Lemonnier & Co., of Paris, devised an apparatus for utilising the electric light on board ship. They proposed to place a small lighthouse in the fore part of the ship, from which the light should be exhibited. They also proposed to use an arrangement called a projector, by means of which a strong beam of light could be sent in any direction required. The apparatus necessary for this purpose consisted of the lamp house, the electric machine, the lamp and projector, and some motive power for driving the electric machine. A practical trial was made of the plan on board the s.s. *Amerique*, of the General Transatlantic Company of Havre, and as far as can be gathered from the reports of the master and others, was completely successful. In order to prevent the red and green side-lights from being eclipsed by the continual brilliancy of the electric beam, an intermittent character was given to the light, and flashes, 20 seconds in duration, followed by dark intervals of 100 seconds, were exhibited, which, it is stated, in no way interfered with the efficiency of the side-lights. If this be really the case, one serious objection is surmounted, but another unfortunately raised up, viz., that a flashing light of this description would be very liable to be mistaken for a light of a similar character shown from a lighthouse or lightship. This is a matter of the most serious importance, and renders it absolutely necessary that unmistakable distinctiveness should be imparted to the electric light when shown on shipboard, as compared with the guiding and warning lights of our coast.

For what may be termed occasional service it is obvious that this light possesses many advantages. There is no doubt that a powerful electric beam projected from the ship in any required direction would render visible, at comparatively long distances, such objects as beacons, buoys, other ships, rocks shoals, icebergs, boats, &c., &c. The value of such service will be evident, especially to those who know by practical experience

what it is to search for a buoy on a dark night; or who have unexpectedly come suddenly upon broken water; or who have experienced the unpleasant sensation of beholding directly a-head the towering ghostlike forms of icebergs looming through the blackness of night. These and others which might be named are some of the perils which a powerful electric beam might mitigate. In addition, it would be possible to illuminate the entrance of ports of difficult access, to take up a position alongside a quay in harbour, and to load and discharge cargo by night. This last is an advantage which will probably commend itself more to shippers and owners, than to masters, officers, and crew. We have already heard of some very successful experiments having been made at Southampton, with the object of illuminating the docks by means of electricity.

Another most useful application of a powerful electric beam would be for the illumination of the upper sails. If this could be effectually accomplished the difficult problem of indicating at night the tack upon which a vessel was sailing would be solved. A ship under way with illuminated topsails would show with ample clearness how she was heading. It will however be asked where is the motive power to produce electricity on board a sailing vessel. To this we can only answer that many large sailing ships are already fitted with small engines to perform sundry work in connection with the ship, and that the production of electricity is another valuable service which such engines might perform. It would not even be very costly if a motor were devoted entirely to this purpose. No great power would be necessary and a small steam or caloric engine would probably do all the work required.

In the foregoing remarks we have merely indicated some possibilities of usefulness for the electric light on board ship, and as experience and confidence in its use gain ground the difficulties in the way of its more general employment for maritime purposes will, without doubt, in time be overcome. The possession of so transcendent an illuminating power cannot be retained by two or three sections of the community for their sole benefit; all classes will claim to participate in its advantages and will endeavour to turn it to practical account. There is little reason to suppose that the nautical com-

munity with their enterprising and utilitarian spirit will be behindhand in regard to the use of this splendid light for their special requirements, and we may be sure that when the various difficulties shall be overcome, and when the means of production of the light shall be reduced in cost and simplified in working, the electric light will be extensively used in navigation on the high seas.

THE DEPRESSION OF TRADE.

IN a letter addressed to the *Times* a few weeks since, Mr. David Mac Iver, M.P. for Birkenhead, drew attention to the facts that British trade with the United States consists at the present time almost exclusively of imports; and that although ships are constantly leaving the Mersey for American ports with little or no cargo, there is no great falling off in the rate of freight for the homeward voyage. He pointed out that while our exports to the States are a mere nothing, there is no apparent reduction in the amount of our imports, and that consequently the "balance of trade" is utterly against us—a state of things, which, in his opinion, can by no means be regarded as healthy. Referring to the alleged depression of trade in foreign countries, he maintained that (so far, at all events, as any business information that has reached him is concerned) there is no truth in the oft-repeated assertion that the trade of foreign nations is as depressed as our own. While admitting that the general trade of the world is depressed he denies that the trade of either the United States, France, Belgium, Spain, Italy, Russia, or indeed of any other country, is as bad as that of Great Britain.

This letter was written in reply to one that had appeared in the *Times* a few days before with reference to the British Shipping Returns for 1878, the writer of which drew consolation from the fact that the figures relating to the amount of tonnage entered and cleared in the United Kingdom during the past year show no decrease of any consequence. Mr. Mac Iver remarks that figures

can be made to prove anything, and then proceeds to call attention to his own actual experience of the present unsatisfactory condition of the "balance of trade."

There are probably few persons who are not aware of the necessity for extreme caution in accepting evidence that has been drawn solely from bare sets of statistics. But there is an old saying to the effect that nothing is so deceptive as figures except facts, and of this it may not be altogether amiss to remind those who so unhesitatingly stake their personal experience against the testimony of official returns; for of all kinds of erroneous reasoning there is perhaps not one more common than that in which individuals draw false general conclusions from particulars that have fallen within the range of their own experience.

It is impossible to meet Mr. Mac Iver's assertion that the trade of foreign countries is in a much healthier state than our own with rebutting evidence in the shape of statistics, since there are not complete returns at hand from which "anything" can be proved. But considering the alleged fallibility of figures in matters of this kind it may be that this is not much to be regretted. The great point for which Mr. Mac Iver contends is with regard to the greater depression of trade in Great Britain as compared with the depression in other countries, and here the first consideration that strikes the ordinary observer is that although the contention may be a perfectly sound one, it proves nothing. The extraordinary depression of British trade is the bug-bear that is constantly being paraded by those who believe that reciprocity is the only means by which the country can be saved from ruin. Unable to explain by what mysterious process this result is to be achieved, they take their stand upon statements of the kind above referred to. They point out that the trade of other countries is not in a particularly bad state, in spite of the alleged unfavourable influence of protective duties, while England on the other hand is on the verge of ruin, in spite of her adherence to the principles of free trade.

Those who illustrate their ideas of political economy in this simple manner appear to lose sight of the important consideration that foreign nations cannot possibly suffer from such extreme trade depressions as this country, for the simple reason that they have

not a similar trade to be depressed. We will not, for the present, discuss the question whether the depression in this country is so great as some persons would have us believe. We may take it for granted that it is so, but in doing this there is no necessity whatever for assuming that our troubles are the results of free trading, or that the comparatively flourishing condition of other countries is the result of protection. Yet these are the inferences which the supporters of protection and reciprocity plainly wish the country to draw from the "hard facts" which they bring forward. Mr Mac Iver, in his letter above referred to, dwells chiefly on the fact that our trade with the United States consists almost entirely of imports; but when we consider that under no circumstances could England send anything but manufactured goods to the States, and that with a view to prohibiting the importation of these the Americans have imposed duties so high as to be absolutely restrictive, we cannot well feel surprised that our exports to Boston and New York are so small. British skill and enterprise can accomplish a great deal, but it is too much to expect that they can produce goods in this country, pay the cost of their transport to America, and a duty which in many instances amounts to cent per cent on their value in this country, and then sell them to the Americans at a less cost than that for which they can be produced in America. It speaks well for British industry that it was able during the last year to send half-a-million pounds' worth of manufactured goods to the States in spite of protective duties, whilst the quantity of such goods sent to this country from the States was so small as to be considered unworthy of enumeration in the annual returns. (We must apologise to protectionists for this unavoidable reference to figures.) A great deal has been said about the appearance of American manufactures in English markets. Alarmists have done their best to persuade the country that its own wants will soon be supplied by our clever cousins on the other side of the Atlantic; but unless these goods are being smuggled into the country, unnoticed by the Customs' officials, their existence must be mythical, for the total quantity of such goods brought into the United Kingdom during the year 1878 was too small to require serious attention.

Mr. Mac Iver admits that the trade of the world is undoubtedly depressed, but while doing this he dwells gloomily on the abnormal depression from which he asserts that England suffers. But, as we have already pointed out, considering that England is the world's greatest producer, and that the manufactured exports of no other country can be at all compared with our own, it is quite unnecessary to have recourse to the supposed influence of protection in order to explain any phenomenon of this kind. That other countries should be entering into a kind of unconscious combination against England by levying high duties on her goods for the protection of their own manufactures, is the best possible evidence of our continued superiority as a manufacturing nation. That they can "protect" themselves into supplying British markets with goods at a cheaper rate than that at which similar goods can be produced in this country, is a moral impossibility.

Those who believe in reciprocity as a means of remedying the present depression of trade, have not told us precisely how this great object is to be secured. With the exception of sugar we are not aware that there is any manufactured import on which a foreign government grants a bounty. And the industrial future of Great Britain can hardly be said to hang on the question whether her sugar manufacture is to be extinguished by the bounty-fed competition of foreigners. The fact is that French sugar and French silk are almost the only goods from which we could possibly "protect" ourselves. The principal manufactured articles of export from this country are hardware and textile fabrics, and with these no country can possibly compete with us in the world's markets so long as it fosters high prices at home by high protective duties. And as soon as the "general trade of the world" revives, Great Britain will undersell her protected competitors as surely as the morrow's sun will rise. It may be that she will be unable to supply nations like the United States with the goods which they choose to protect, but so long as her natural resources are unexhausted, and so long as her trade remains unfettered, she will certainly be able to prevent these carefully nurtured foreign goods from being pushed forth into the world. When England has adopted the hot-house system of protection and reciprocity, then, and not

till then, her competitors will meet her on something like level terms.

We have hitherto assumed that Mr. Mac Iver's statement with regard to the comparatively greater depression of trade in this country is perfectly correct. And we have endeavoured briefly to show that, even on this assumption, there is no cause for alarm, seeing that foreign nations produce but little in the shape of manufactured goods beyond what they require for their own consumption. But as a set-off against the information Mr. Mac Iver has obtained from private business correspondents, we quote the following extracts from a letter of the New York correspondent of the London *Standard*. This letter bears date 30th March, 1879, and was written with reference to the great migration of population which has recently taken place from the Eastern to the Western States of America, and not with any special regard to the question of protective duties.

"About twelve years before this date (1873) a highly protective tariff had been enacted by the Congress of the United States in order to encourage native industry; that being regarded here as the proper way to do it. Under the influence of that tariff the building of factories and machinery was greatly stimulated. Cotton mills, woollen factories, blast furnaces, rolling mills, and steel works sprang into being in every well-populated part of the country lying north of the cotton-growing States. The blast furnaces increased from about five hundred to seven hundred in number; the new furnaces growing larger and more efficient with the flight of every year. The same, in a general way, was true of all the other industries. In order to work these factories it was necessary to have more labour than the United States could supply. Companies which built many of the new cotton, silk, and woollen factories were forced to go to Canada and Europe to obtain operatives, and they did this, bringing to this country spinners and weavers by the car load and ship load. Skilled mechanics were also sought for, and the consequence was an increased immigration to the United States from England, Germany, France, and Italy, as well as from Ireland and Scotland. . . . Then occurred the terrible panic of 1873—a calamity due to over-trading, speculation, excessive

credits, and wild enterprises. Confidence was shaken in many of the great ventures of the day. Capital was withheld from schemes to which it had been promised, and there was a general stoppage of work all over the country. The United States had been spending from two hundred million dollars to three hundred and fifty million dollars a year in railroad building, principally in the West. There was an immediate and remarkable shrinkage in this expenditure. The plough was left sticking in the furrow, and many lines abruptly stopped unfinished, and remain unfinished until this present time. The expenditure fell off to about fifty million dollars a year, and the tens of thousands of engineers, labourers, and mechanics who had been employed in building the roads, and manufacturing the iron, cars, engines, and other equipments for them were thrown out of work. . . . The falling off in the demand for iron was so sharp that two hundred and fifty blast furnaces, and from fifty to eighty rolling mills had to close their doors. There was also a falling off after 1873 in the demand for the products of the cotton, silk, woollen, paper, and other factories of the country. The result of the reaction was that an immense body of people were thrown out of work in 1874, and this country has been suffering grievous distress. The failures of 1873 reached the enormous figure—enormous for this country—of two hundred and twenty-eight million five hundred and eighty-nine thousand dollars, and they have averaged two hundred million dollars a year ever since. It would be hard to tell how many people exactly this state of things threw out of work. They reached hundreds of thousands, and the Eastern States of the country have been staggering along under this load of a surfeit of population for six years. Nothing in the world except the solitary fact that the crops have been good, and that England and the continent of Europe have bought such enormous quantities of our agriculture produce—that is to say, from three hundred million dollars worth to six hundred million dollars worth a year—has saved us from painful suffering."

Unless the foregoing greatly exaggerates the condition of things in America, it is quite certain that Great Britain does not suffer from such a monopoly of exceptionally bad times as Mr. Mac Iver would have us believe.

ARMOUR PLATES.

AT the meetings of the Institution of Naval Architects on the 3rd ult., two able papers were read bearing upon the question of armour plates, one by Mr. Barnaby, the Director-General of Naval Construction, the other by Admiral Sir Spencer Robinson, late Controller of the Navy. In our April number we reviewed the present condition of the question of guns *versus* armour, and described the most recent developments of the latter both as regards the material used and the means of applying it; we therefore do not propose to go over the ground again, but merely to notice such parts of the papers as furnish information supplementary to that given by us. In the main, the latest official word on the subject does not add much to what we then placed before our readers. Mr. Barnaby briefly traces the progress of armour plating from its adoption till its latest developments, showing how with increase of armour thickness the area of protected side has gradually decreased. "As to the sea-going fleets," he remarks, "we have already proceeded far in stripping the armour from their sides, and coming back to the old condition, but with this important difference: the vital parts of the fighting machine are protected against the enemy's guns to such an extent that no single shot or shell shall be capable of disabling it. This protection, however afforded, appears to be indispensable in ships designed under such conditions of warfare as now exist. This is the nature of the protection given to the great Italian first-class battle ships *Lepanto* and *Italia.* They are to have enormous power of engines and guns, but they are not ironclads. They are protected ships, and it cannot be denied that they are also armoured ships. They have an underwater deck of three-inch armour weighing about 1,200 tons, and they have probably an equal weight of armour of eighteen to twenty-seven inches protecting their internal vital parts." He also refers to the use of coal armour, as it is called, saying:—"Not less interesting is the protection which has been recently devised in England for the merchant

ships employed in a time of war under the Queen's flag. No amount of resistance which an armour plate could show, would give the satisfaction which I received from the excellent behaviour of the simple combination of fuel and thin loose iron sheets. Coal armour and torpedoes together have given to the fast merchant shipping of England a significance in warfare wholly new." In connection with this point we may remark that in one of the best papers read at the meetings, and in which Mr. White of the Admiralty describes the structural arrangements of H.M.S. *Iris*, it was shown that that vessel has her bunkers so arranged as to completely surround the engine and boiler rooms, although they are of an aggregate length of 138 feet out of the total length of the vessel, which is 300 feet. The *Iris* is an unarmoured war-vessel and enjoys the distinction of being the fastest sea-going vessel in the world. We must, however, demur to the high estimate put upon coal armour, for the simple reason that one cannot be certain that it will be in the ship when wanted. If in the wars of the future our ships are to choose just their own time and place for fighting, and can comfortably and quietly, from a tender in waiting, fill up all their bunkers before going into action, the coals may afford a valuable defence against the enemy's fire, but if the bunkers are half empty the case will be altered very much for the worse. We have further in the paper a brief account of the more recent experiments on steel armour, which we summarised in our April number. The future of the compound iron and steel plates will, we suppose, be largely dependent upon the results of the trials of them so made in connection with the *Inflexible's* turret plates. The conditions laid down with regard to them are, "that a piece about 6 feet long, cut off the bent plate of the turret, and secured to backing, shall neither be perforated nor cracked through by the shot which would perforate a similar piece of iron; and that if the edges of the test piece are supported by a frame no one of three such shots planted at intervals of two feet shall get through." It is also stated that the Italian Government intend shortly to test, with one of their large guns, some armour plates made wholly of steel, simply cast, and produced at the iron works at Terre Noire and Creusot in France. If the results of these trials are at all

satisfactory, the price of armour will be much reduced, will be in fact but that of large castings. Perhaps most of our readers may think with us that this will be a doubtful advantage.

Sir Spencer Robinson's paper consists chiefly of a detailed history of the armouring of war-ships, and an elaborate *resumé* of experiments on armour plates from as far back as 1863 to 1877. As might be expected from the prominent part the writer has taken in the construction of war-ships, there is much of considerable interest; there is so much, however, altogether, that we cannot attempt to give even an abstract of it, but must confine ourselves to stating the conclusions to which he appears to have come. These are that *sandwich* armour will prove to be a failure, and that the most effective defence for ships would be provided by a compound backing after a plan invented and patented by a Mr. Hughes, and known as the Millwall system. An experimental target was made upon this plan, and tried at Shoeburyness about ten years ago. The arrangement of the backing is thus described:—
"Behind the armour plates are a series of hollow stringers seven inches deep, running horizontally, their outer faces in contact with the inner part of the armour plates. The inner part of the stringer has two flanges rivetted to a skin formed of two thicknesses of ¾-inch iron. Behind this there is a vertical hollow stringer of the same description, the hollow part turned outwards. Both stringers where hollow are filled with wood. At the back of these vertical stringers or frames there is a covering plate or inner skin of 1-inch iron."

It is hardly necessary to remark that a ship constructed on this plan would be a still more expensive article than our present very dear ironclads are, unless it would result in a very material decrease in the weight, and consequently the size, &c., of the ship. The experiments on the Millwall shield appear, so far as we can see, to have been very inconclusive, and it would seem to be desirable that advantage should be taken of the coming trials of steel armour to test the value of Mr. Hughes's, or some other perhaps less expensive but equally efficient system of compound backing. In the early days of armour plating a number of targets were tried in which there was no backing, and all sorts of substances were

tried as backing. The *Warrior* had a wood backing four times the thickness of her armour plates, and it may be said that the *Warrior* target beat all its competitors as regards resistance to shot. It was conclusively proved that much more effective resistance to shot was obtained with some kind of cushion behind the armour than with an unbacked plate, but it was soon seen that the *Warrior* had more backing than was really necessary, and in the *Minotaur* and other vessels only nine inches of wood backing was used and a five and a-half inch substituted for a four and a-half plate, the total weight per square foot of surface remaining the same. When the question of the desirability of having a mixed backing of wood and strips of iron was raised, it was said in answer that the best thing is to put as much iron in one solid plate as possible rather than increase the weight of backing. The resistance to penetration varied as the square of the thickness, and consequently a seven inch armour plate, for instance, was worth double as much as a five inch plate. Now we have got to very much thicker armour, and it is found that the effective resistance of very thick plates does not follow the same law, but varies more nearly as the thickness than as the square of the thickness. It may be then that more iron may be put into the backing with as much advantage as if put in the solid plate. The only way to be certain is to have some experimental tests.

Sir Spencer Robinson's objection to the so-called *sandwich* system of armour, in which, as explained in our former article, two armour plates are used with a layer of teak between as well as behind them, appears to be chiefly that a shell exploding in the wood backing between the two plates will blow the outer one bodily off the target, and it is even said that a guncotton shell has been designed for the special purpose of doing so. The advantage gained by having two thin rather than one thick plate is that, in the present stage of armour plate manufacture, much wider plates can be obtained when they are of the lesser thickness, and thus the great evil of numerous joints in the armour is avoided.

THE NATURE AND MOTIONS OF ATMOSPHERICAL DEPRESSIONS.—Part II.

IN turning from the theoretical view to treat of the weather conditions experienced over these islands, it would have been desirable to have illustrated the subject by means of the "Daily Weather Charts," but as that would be impracticable within the compass of an article, I must content myself by endeavouring to make my meaning clear without their aid.

It must be apparent to everyone who has given the least attention to our argument, that the depressions with which we are acquainted are quite different in their general character from those formed by the sun and moon within the tropics; and this will be further evident from a variety of considerations. The depressions in the vicinity of the equator have east winds both to the north and south of them, whilst the cyclones in our neighbourhood have always east winds on their northern and west winds on their southern sides. In the calm belt or region of equatorial depressions cyclones or revolving storms are unknown, and the reason of this will readily appear by means of the experiment of the rotating hemispheres. If the two outer hemispheres, A and B,* be made to rotate, the one with, the other against watch hands—and we know that these are the conditions of the circulation north and south of the equator—the central hemisphere C will remain at rest. We thus see that a cyclone circulation is impossible under such circumstances, and that a revolving storm can only happen between two rotating waves which are revolving in the same manner—either both with or both against watch hands. In one word the equatorial depressions produce the circulation, whereas the cyclones are the result of it. The winds do not circulate round the equatorial depressions; a true depression, without any progressive movement, would only give rise to waves or oscillations. If, however, it should possess a progressive movement, it would produce two separate systems of circulation, one on each side of the disturbing cause, and revolving in contrary directions.

* See *Nautical Magazine*, January, 1879, page 13.

If we form a miniature whirlpool in a cup of tea, it is quite clear that the depression or hollow noticed in the middle is the result of the circulation, for the faster the liquid is made to move the deeper the hollow becomes. The circulation really produces two effects—whilst the centre is depressed the sides are elevated. I am inclined to the opinion that whirlpools are made up of a number of rotating waves as shown in Figures 1, 2, and 3.

FIG. 1.

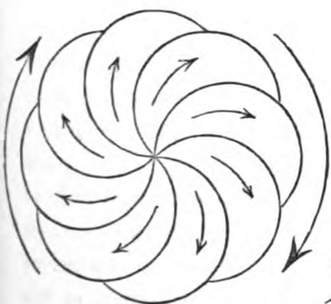

FIG. 2.

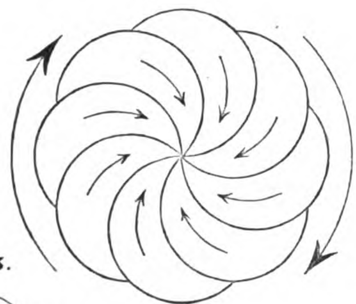

FIG. 3.

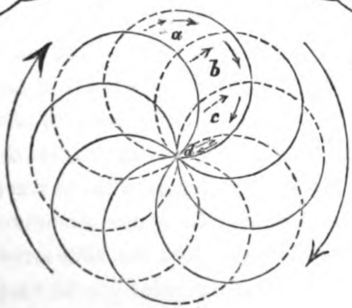

Figure 1 represents the falling sides of the waves or motion away from the centre; Figure 2 the rising sides of the waves or motion towards the centre; Figure 3 shows the whole of the waves, the broken line showing the falling side and the continuous line the rising side of the waves. The large arrows show the direction in which the waves are revolving.

In each section shown in Figure 3 there is therefore a rising and falling motion of the water—the falling motion, I believe, giving

the requisite inclination or gradient for the flow of the current, and the rising motion feeding the stream. In section (a) the falling motion is nearly coincident with the rising, as shown by the small arrows, the broken one representing direction of falling motion and the other the rising motion of the gradients. In section (b) these motions are at right angles, in section (c) nearly opposite and in (d) exactly so. Many of the features of cyclones are visible here. There is this difference, however, that in the whirlpool these rotating waves are stationary, as may be readily seen by any observer, whilst those in the cyclones have a progressive movement. I must not be understood as affirming that the cyclones are formed by the rapidity of the rotation alone. They are the result of the rotatory and progressive movements combined —the former adding to their depth, the latter extending their area. Near the centre there is a calm area, and the steepest gradients are to be found in its vicinity.

But the most important inference to be drawn from a study of these motions is that every current presupposes both a rising and a falling gradient. It does not require much attention to perceive that to produce a current we must not only have a gradient, but a fountain or head to supply the stream. Of course in the atmosphere it is hardly possible to form a gradient without producing conditions favourable to the development of a current; at the same time it occasionally happens that extensive gradients—in some cases very steep—are formed without winds of very great strength being experienced. In every strongly marked current, therefore, we may confidently look for both a rising and a falling gradient. The south-westerly current provides a familiar example. When strong we have a rising barometer over France, and a falling motion from the north-west, the former supplying the wind and the latter forming the gradient along which the south-westerly current flows. A south-westerly current is, therefore, the product of a south-westerly rising and a north-westerly falling gradient. The necessity and utility of the rising and falling motion of the great gradients must now be apparent. I arrived at this conclusion, before I thought of the whirlpool, from an examination of the "Daily Weather Charts," and its truth will, I

think, be acknowledged on a very slight inspection of those charts which show well-developed currents.

As all our waves have a progressive movement, it is plain that the two sides of the wave at right angles to the line of progression are the most important, and we will confine our attention to these. No one who has watched the progress of the waves from the deck of a vessel could have failed to notice that the water was rising in front of the advancing wave and falling behind it, and when two waves met they caused a much higher compound wave, and after as it were a moment's tussle for the victory they passed through each other and left behind them a much deeper compound hollow. Similar effects undoubtedly take place in the atmosphere.

In treating further of these waves or gradients it will be convenient to adopt the nomenclature employed above in speaking of those producing the south-westerly current. When we have a motion from the south-east we will call it a south-easterly rising or falling gradient, according as the barometer rises or falls. A wave from the south-west will be called a south-westerly rising or falling wave, and so on. Now, as the wind, generally speaking, blows at right angles to the wave, by simply observing the direction of the wind, and the rise or fall of the barometer, we can tell how the wave motion is progressing, and also form a fair estimate of the movements of the respective gradients by considering the strength of the current and the rate and amount of the rise or fall of the barometer. Thus, a strong wind from the south-west, with a steady barometer, would indicate that the south-easterly gradient is rising as much as the north-westerly is falling; with a rising barometer that the south-easterly gradient predominates; with a falling barometer that the north-westerly wave is the stronger.

To produce a south-westerly current we thus see that a north-westerly falling wave is required; a north-westerly current requires a north-easterly falling wave; a north-easterly current a south-easterly falling wave; and a south-easterly current a south-westerly falling wave. These currents will not be strong unless there are strong rising gradients from the opposite point of the

compass. No doubt the reaction of the air would of itself, for a short time, supply the current.

From a consideration of the whirlpool, we learn that the air of a south-westerly current must come round from the south-east; of a north-westerly from the south-west; of a north-easterly from the north-west; and of a south-easterly from the north-east. The effects of these currents must therefore be viewed in the light of the region whence they come. A south wind, coming as it does from the east, will, therefore, in winter bring a low, and in summer a high temperature, as in winter the continent has usually a lower and in summer a higher temperature than these islands.

Another principle deserves attention. It is quite evident that a current may become a wave and a wave a current. When the south-westerly current stops for some reason or other the wind usually veers to north-west, and the barometer rises; these changes indicating that the south-westerly current has become a south-westerly rising wave. A current may change into a wave either on account of the friction of the earth—perhaps more correctly the friction of the lowest stratum of air,—or on account of a stoppage in front, something there checking its course. If the check is only due to friction the current will probably, after a short interval, resume its course. In a south-westerly current the south-westerly wind is seldom of long continuance, and the reason of this is not far to seek. We see the same principle exemplified in the bounding leaps which water takes in coming down a steep hill, also when a vehicle is driven down an incline, the hinder part has a tendency to rise up, and the driver requires to keep the horse's head well up as a kind of counterpoise. The top of the current goes faster than the bottom, and a rising wave is the result. The wind, therefore, cannot continue long in a right line with the force of the current or tendency, but constantly veers or backs according as the wave approaches or recedes, at the same time its natural tendency is to place itself in a line with the current.

If the south-westerly current is thus only stopped by friction the barometer rises, and the wind veers to the north-west, the

north-west wind will rapidly die down; the wind will then back to south-west, and as the wave recedes the wind will back to south-east: when the last traces of the wave have disappeared the wind veers rapidly to the south-west, blows for a short time in the line of the current, and so on. These may be called the normal changes which take place in currents, and I have already tabulated them in the December number.

In the wind itself, as distinguished from the general current, similar changes will, no doubt, occur. When its velocity is very great a wave will be formed, and whilst it is passing a lull takes place, and on its receding the full force of the storm is again felt. In the case of a very violent wind, as a hurricane, the rotating wave thus formed will be of considerable extent. So long as all the particles of a current move with uniform velocity a smooth flowing stream is the result, but when they move at different speeds waves are the inevitable consequence. The air, therefore, proceeds either by waves or currents, according to the existing conditions.

It is also evident that the current, besides being stopped by friction, may receive a check in front or at its source. In the former case, another current, proceeding in the opposite direction, is the probable cause; as, for instance, a north-easterly current meeting a south-westerly, when an area of high pressure would be formed. The two opposite waves would probably pass through each other, and leave behind an area of low pressure; and if at the same time, or rather during the formation of these falling gradients, there should be also north-easterly and south-westerly rising gradients, then gales from the south-east to the north-west would be produced.

Our most destructive storms are, I believe, brought about in this way. Two strong opposite waves meet, causing a rapid rise of the barometer; after a short time the barometer begins to fall, the waves recede, and a cyclone ensues.

The times of the oscillation of these waves have an important bearing on the results which they produce, but as the combinations which they are capable of forming are endless, I cannot enter further into the study of them here, but must now pass on to

consider the effect of the tendencies exhibited in the Forecast upon these currents and waves. According to the principles already stated these results should be very similar to those shown in the following Table :—

TABLE SHOWING EFFECT OF TENDENCIES UNDER VARYING CONDITIONS OF WIND AND BAROMETER.

Tendency from.	Wind.	Barometer Rising.	Barometer and Wind Falling Strong.
S.W. N.W. N.E. S.E.	N.W. N.E. S.E. S.W.	Wind light. Fine weather.	Heavy Gales. Especially if fall considerable and continues.
S.W. N.W. N.E. S.E.	N.E. S.E. S.W. N.W.	Anti-cyclone. Succeeded by possible storm if rise of barometer rapid.	Heavy Rain or Snow.
S.W. N.W. N.E. S.E.	S.E. S.W. N.W. N.E.	Anti-cyclone. Fine weather.	Moderate to Fresh Gales. Strong gales if barometer high opposite to Tendency, for example, during S.Wly. tendency barometer high to the N.E.
S.W. N.W. N.E. S.E.	S.W. N.W. N.E. S.E.	Electric action. Winds light.	Conditions only possible for a short time. Winds veer and fall light and barometer rises.

During a strong south-westerly tendency, with the wind blowing strongly and steadily from the north-west and a rapidly falling barometer, a heavy north-westerly gale may be expected, with the wind in the south-east, a south-easterly gale. During north-westerly tendency, gales from the north-east or south-west may be experienced. During a north-easterly, gales from the south-east and north-west may be looked for and so on.

The currents or tendency due to the sun must be carefully considered as, generally speaking, the strongest gales will probably blow along its rising gradients, as shown in Figures 3 and 4, Part I., and the stormiest weather will likely be experienced when the gradients due to the sun and moon are opposite ; so that in winter when the sun's gradient is for easterly winds over the

British Islands, the stormiest period will likely be during the times of the moon's westerly tendency. During the rest of the year the stormiest period should be at the times of the moon's easterly tendency. It is to these combined or opposite actions of the sun and moon that we must look in determining the relative times of fine and stormy weather.

The observation of the barometer is a kind of perpetual experiment, and nothing is more important than rightly to interpret its indication. In still air it tells us the height of the atmosphere, but that is a condition of the air that is hardly ever experienced. We ought, therefore, to remember that our barometers are almost always in currents, and that must affect their readings very considerably. We must consider how far the rise and fall are due to the rapidity of the current—to condensation or rarefaction.

Although in the main the depressions in our neighbourhood will be secondary to those formed within the tropics, yet it is extremely probable that they will also possess in some measure the characteristics of the primary ones, for the depression existing in the earth itself will doubtless give rise to secondary depressions north and south, and, as far as I have yet observed, the mercury in the apparatus for measuring the intensity of gravity seems to rise and fall simultaneously with the ordinary barometer, although to a less extent. This is a factor of some importance, and should not be neglected in weather study. The colliery explosions which occur so frequently, may be rendered more imminent by the presence of such earth depressions, and this instrument might possibly be useful in indicating the approach of these depressions.

My chief design in these remarks has been, if possible, to do something towards enabling the navigator to determine from local observation the condition of the surrounding atmosphere, and to form a probable estimate of the change most likely to occur, so that he may be able to take advantage of it if favourable, and avoid—or, if that should prove impossible, be prepared to meet it, if unfavourable. Whilst in port the information conveyed by the Meteorological Office must be of great value, but once under weigh he is left to his own resources, and is dependent upon his own judgment in forming such an estimate.

The time is, I hope, not far distant when we may be able to draw up such a set of rules as may be applicable to almost every contingency that may arise, and thus enable the seaman to forecast with all but absolute certainty every coming change.

D. D.

THE SWEDISH ARCTIC EXPEDITION BY THE WAY OF THE NORTH-EAST PASSAGE.

IN the March number of the *Nautical Magazine*, we proposed to give a brief narrative of the "Swedish Arctic Expedition by the Way of the North-East Passage," projected and undertaken by Professor Nordenskiöld. We may not inaptly commence by indicating the circumstances which led to it, and by showing what had previously been done in that direction to facilitate the accomplishment of so important an enterprise.

Burrough, equipped in 1556 by the Anglo-Muscovite Company for the purpose of reaching the river Obi, found Ugor strait filled with drift ice in August. He was the first who attempted the passage of this strait.

Pet and Jackman, in 1580, undertook the N.E. passage to China in a 40-ton vessel, and passed through Kara strait into the Kara sea; but in July they were so beset by ice that, with the greatest difficulty, they reached Ugor strait, through which they passed on their return. This strait had never been navigated before, and should therefore properly be called Pet strait.

Nai and Linschooten, on the 1st of August, 1594, passed through Ugor strait into the Kara sea (the Nieuwe Noord Zee), and reached Kara bay, a deep bight at its south-eastern end; on the passage they were only once beset by ice; and returned because they considered they had arrived at the mouth of the river Obi. They started again the next year (1595) with Barents as a companion, and, after many ineffectual efforts to penetrate

the Kara and Ugor straits during the month of August, accomplished the passage into the Kara sea on the 2nd of September, but were speedily driven back by gales and ice.

Hudson's attempt to reach the Obi in 1608 was undertaken too early in the season, and he left the vicinity of Waigatch island on the 6th of July.

Bosman, in 1625, after encountering much ice in August, passed through Ugor strait into the Kara sea, but was soon driven back by tremendous gales and huge masses of ice.

In 1653, vessels despatched by a Danish trading company endeavoured, but without success, to penetrate Ugor Strait.

Murauyeff and Pauloff, in 1734, might have reached the mouth of the Obi, inasmuch as in August they had passed through Ugor strait and in a single day traversed the south part of the Kara sea, bringing up in Mutna bay on the western shore of Yalmal peninsula; but by the end of August they had only arrived at the northern extremity of this peninsula, and then, as the season was so far advanced, they considered it better to return. In the following year (1735), they had penetrated Ugor strait by the 2nd of August, but encountered thick ice immediately on entering the Kara sea, so that only one of their two vessels reached Mutna bay, and this not before the 4th of September, when they determined to proceed no further.

Malygin, in 1736, was stopped at the eastern entrance of Ugor strait, and had to winter near the mouth of the river Kara; departing thence in July, 1737, he reached the northern extremity of Yalmal peninsula on the 4th of August, and the mouth of the Obi on the 23rd of September. Entering the river, he brought up for the winter at Beresov; but as he himself returned overland to St. Petersburg the vessel was left in charge of Skuratov and Golovin who took two years in returning to Archangel; Malygin had coasted the Yalmal peninsula in 50 days, but on the homeward voyage it was not done under 60 days, so that by the middle of September, 1738, the vessel was fast in the ice at the mouth of the Kara river, and compelled to winter there.

In 1769, Rossmyslov, who had wintered in Matotchkin strait, purposed crossing the Kara sea to the mouth of the Obi river;

but on the 3rd of August, while not more than 8 miles from the Novaya Zemlia coast, his vessel struck on the edge of the ice floe, and became too leaky to proceed.

On the 13th of August, 1824, Lütke, from the northern cape of Waigatch island, could see no ice in the Kara sea, but he had not shaped his course far before he was stopped by a wall of ice; he waited a week in expectation of a change, but in vain.

Krotov, in 1832, set out for the river Yenisei, intending to enter the Kara sea by way of Matotchkin strait, but his vessel was wrecked at the entrance to the strait.

Krusenstern entered the Kara sea through Ugor strait in 1862, but his ship was beset by ice at the opening to Kara bay in August; he was compelled to abandon her in lat. 69° 57′ N., long. 66° 2′ E., on the 21st of September; and from that date until the 28th he, with the crew, endured the greatest hardships, wandering from floe to floe until the Yalmal peninsula was reached; here they were hospitably received by the Samoyedes who conducted them overland to the town of Obdorsk, and whence they departed for the Petchora.

The years 1869-70-71 were remarkable for the number of voyages made around Novaya Zemlia, and through the Kara sea, by several Norwegian fishermen, for the purpose of opening up new fishing ground; while in the prosecution of their main object these seamen were careful to make a series of scientific observations, which afterwards proved of great value to Nordenskiöld. These voyages were in progress during each of the years mentioned above, from the end of May to the beginning of October. Carlsen, Mack, Simonson, and the brothers Johannesen deserve special mention in connection with the results that their well-kept journals furnished. While the sea westward of Novaya Zemlia was often navigable throughout the season, the Kara sea could rarely, if ever, be entered by the way of Kara and Ugor straits earlier than the middle or end of July; thick ice blocked the way: from a similar obstruction, there was no egress from the Kara sea after the middle of September, or very early in October; at the beginning and end of the season the ice lay thick along the eastern shores of Novaya Zemlia and the north-eastern

side of Waigatch island, sometimes even while the Kara sea was quite navigable eastward of the meridian of 63° or 64°. This sea can only be entered and left by the way of the straits, during a limited period, between the end of July and beginning of September.

The Rosenthal expedition in the steamer *Germania* (with Captain Melsom and others), in 1871, started with the intention of crossing the Kara sea, proceeding to the Obi and Yenisei rivers, navigating the latter as high up as Briochov island, and thence taking route to the New Siberia islands; but they were unable, in August, to penetrate Matotchkin strait, and found Ugor strait blocked by ice in September.

The later expeditions in this direction during the years 1874-78 will be found detailed in the March number of the *Nautical Magazine* (pp. 218, *et seq.*); they are chiefly the voyages of Nordenskiöld and Wiggins.

So far the physical character of the route from Western Europe to the Yenisei river had been well determined by the beginning of the year 1878; Arctic voyagers had also, at different times, traversed the sea from Behring strait for a few degrees westward; but there remained a long distance between the Yenisei and the meridian of 170° E. respecting which very little was known, and that little was far from favourable.

There was the Severo-vostotchnoi, the northernmost cape of Asia, supposed to be the Promontorium Tabin of Pliny, and which Lieut. Chelyuskin had reached, in 1742, by a sledge journey overland; its reputed position was 78° 20′ N. on the meridian of 100° E., and it formed the most seaward projection of the broad area of land between the rivers Yenisei and Chatanga, called the Taimyr peninsula. This cape, called also after Chelyuskin, had to be rounded, and there was no record of any vessel having hitherto succeeded in doing so. Efforts had been made by some of the small coasting craft that occasionally leave the Yenisei, notably in 1738 and 1750; and the lat. of 75¼° N. had been reached, but the month being September, which was considered late, the vessel turned back, though no ice was met with. It was also known that when Middendorf reached the coast of the Taimyr

peninsula, at the end of August, 1843, no ice was visible seaward in any direction.

Beyond cape Chelyuskin lay the great river Lena, with its delta; the Chatanga and Olenek drain the country between the Yenisei and Lena, while eastward of the latter are the Yana, Indigirka, and Kolyma rivers. Of the attempts to round the cape from the Lena side, none had succeeded. These generally started from Yakutsk, in vessels built there; one expedition under Lieut. Prontshicheff, in 1735, wintered in the Olenek river, and the next year (1736) reached 77½° N. in September, but was then driven back by heavy masses of ice. Another expedition, in 1739, under Lieut. Laptieff, also failed to reach the cape; but the coast between the Lena and Kolyma rivers was successfully navigated by Laptieff in 1740, and he spent the winter on the Indigirka. Between 1809 and 1823 the New Siberia islands, north-eastward of the delta of the Lena, were examined and surveyed by Hedenström, Anjou, and Baron Wrangel, but these were sledging expeditions across the ice. The islands had been discovered by Stadushin, through the reports of natives respecting outlying land that yielded ivory.

Behring passed through the strait that goes by his name in 1728; but Deshnef, a Cossack adventurer, starting from the Kolyma river, had navigated it with a small fleet in July, 1648, and reached Anadyr gulf, on the Pacific, in the following October. Many Arctic navigators have explored Behring strait and the Polar seas beyond; notably, Cook on his third voyage in 1778, Beechey in 1826, Kellett in 1849, Collinson and McClure in 1850, Rodgers (United States Navy) in 1855, and Long in 1867, but most of their investigations lay in the direction of the American shores. Cook, in August, examined the Asiatic coast as far as the meridian of 180°, and found open water; Rodgers reached 176° E. without obstruction; Kellett had reported land to the northward on the meridian of 180°, which has been designated as Wrangel land; and Long, supposing he saw the same land, named the wide strait between it and the Asiatic shore Long strait, pushed on to long. 170° E., and then returned.

Professor Nordenskiöld, after his Arctic experience in the expe-

dition to Spitzbergen (1872-73), and after two successful voyages through the Kara sea to the Yenisei (1875-76), critically examined the results of all previous voyages made northward and eastward of Novaya Zemlia, and westward from Behring strait. Having come to the conclusion that, by starting at the proper time of the year, the North-East passage might be made in one season, he resolved to attempt it; or if it occupied more than one season, the advantages to be derived from the investigations he proposed to carry out would more than counterbalance the cost of the enterprise. The greater part of the region to be traversed was, from a scientific standpoint, wholly unknown; here and there, at wide intervals of time, adventurous Russian explorers had found their way, had made a rough running survey, and taken a few imperfect observations; and these, incomplete as they were, indicated that they had a value beyond any that might immediately appertain to the inhospitable shores on which they were made. For commercial purposes the N.E. passage might never be available, but commercial enterprise would undoubtedly, at an early date, open up communication between the rich entrepôts in the interior of Siberia and Western Europe: on this account questions in geography and hydrography awaited immediate solution. But there were other subjects no less important than these; every branch of physics and natural history had something to demand, but heretofore there had been no response, for there had been no crucial investigation of the Siberian coast and seas;—a knowledge of the geology, meteorology, magnetic character, ethnology, zoology and botany of the region had yet to be acquired, notwithstanding that the solution of many a physical problem seemed to lie there.

The funds for such an expedition were speedily forthcoming. The Professor's old friend, Mr. Oscar Dickson, the banker of Gottenburg, came forward with more than half the sum required; the wealthy Siberian, Mr. Sibiriakoff, contributed his quota; and additional assistance was given by the king and government of Sweden, under whose auspices and patronage the expedition set out.

The *Vega*, a strongly-built steam whaler, well adapted for Arctic

exploration, was bought for the service; she was equipped with every appliance that experience could suggest as necessary for a cruize in Polar waters, adequately provisioned, and fitted up for securing the health of all on board; the means for sledge travelling were not forgotten; and the scientific apparatus for the purposes of observation and research in a new field were of the most varied description; in fact, the nature of the voyage and the character of the investigations to be made having been duly weighed and considered, nothing was omitted that forethought could suggest to ensure the success of an important enterprise.

The officers and scientific staff are worthy of the occasion, and well up to the work cut out for them. Lieutenant Palander, who was in command of the *Polhem* with Nordenskiöld in the Spitzbergen expedition of 1872-73, commands the *Vega*. Dr. F. Kjellman, botanist, and Dr. A. Stuxberg, zoologist, had been Nordenskiöld's companions in the voyages to the Yenisei in 1875-76. There are also Dr. E. Almqvist, Lieutenant A. Hovgaard of the Danish Navy, Lieutenant E. Brusewitz of the Swedish Navy, Lieutenant G. Bove of the Italian Navy, and Lieutenant Nordqvist, a Finnish officer, as geologist. The crew are all picked men, selected from hundreds of volunteers eager for the voyage. They are 18 in number, with whalemen in the capacity of ice-masters, in addition to which there are three hunters.

The expedition at starting consisted of four vessels: three steamers, the *Vega*, *Lena* and *Fraser*, and the brig *Express*. Of these, the *Fraser* and *Express* were laden with coal, iron, salt, and other merchandize for Mr. Sibiriakoff, and bound for the Yenisei; the *Lena* was also a venture of Mr. Sibiriakoff's and bound for Yakutsk on the river Lena. It had been arranged that the place of rendezvous should be Ugor or Pet strait; there all were assembled by the 31st of July, and found the strait and Kara sea perfectly free from ice.

(*To be continued.*)

PILOT-VESSELS' LIGHTS.

If the collision between the mail steamer *Severn* and the pilot-cutter *Edinburgh* results in an amendment of the regulation respecting pilot-cutters' lights, it will be another illustration of the truth that good may sometimes spring out of evil; and indeed, after the strong expression of opinion by the Court that investigated this casualty, it is not easy to see how an alteration of the law in this matter can be avoided. That the collision was caused chiefly by a mistake on the part of those on board the *Severn* as to the pilot-cutter's lights is certain, although it is equally true that the letter of the regulations as to the use of a flare-up was not complied with on board the pilot-vessel. To this question of the regulations respecting pilot-vessels' lights, the attention of the Court was specially directed by the learned counsel who conducted the case on the part of the Board of Trade, and a very distinct opinion was expressed upon it by the Wreck Commissioner. "In the opinion of the Court," said Mr. Rothery, "Art. 8 requires amendment. Had the pilot-cutter borne coloured lights, the second mate (of the *Severn*) would have had no doubt as to what course the cutter was on. Cutters should be fitted with some lights which would indicate the course they are on." Now Art. 8 of the "Rules concerning Lights" says, that "sailing pilot-vessels shall not carry the lights required for other sailing vessels, but shall carry a white light at the masthead, visible all round the horizon, and shall also exhibit a flare-up light every fifteen minutes."* But why pilot-vessels should be interdicted from carrying side-lights it is not easy to understand. If a vessel is at anchor or hove-to, a riding light should be sufficient to indicate her position—it is when she is moving through the water

* The latter part of this regulation has practically been slightly modified within the last year or two, it having been prescribed that two flares in quick succession shall be shown by the London cutters to distinguish them from foreign pilot-boats cruising in the neighbourhood of Dungeness.

that the side-lights become necessary, in order that it may be seen in what direction she is steering—and if, in addition, some distinguishing light for a pilot-vessel were adopted, that would be all that would be required. It is clear that the flare-up "every fifteen minutes" is of doubtful efficiency. For the carrying out of this rule there is too much scope for human negligence in the shape of forgetfulness, laziness, &c. The man whose business it may be to show the flare, if he remembers it, has perhaps to go below and prepare it, and then show the flare above the bulwarks to nobody in particular. It is probable that there is a good deal of the happy-go-lucky element in the exhibition of the flares. It was in evidence in the recent case, that although a flare-up was shown about 11.40, when the *Edinburgh's* masthead light was lowered in order to be trimmed, and again about 11.55, no flare-up was burnt at 12.10—immediately before the collision—when it was specially requisite, and when, if displayed, it might possibly have averted the catastrophe. The Court, as above mentioned, suggested that a pilot-cutter should carry coloured lights, but whether the Commissioner meant side-lights or distinguishing coloured lights, does not appear. It seems to us that an effective mode of distinguishing pilot-vessels at night might be adopted by employing the same colours by which a pilot-boat is distinguished in the daytime. The Merchant Shipping Act (sec. 346), directs that pilot-vessels, when afloat, shall carry "at the masthead, or on a sprit or staff, or in some other equally conspicuous situation," a flag of two colours—the upper horizontal half white, and the lower horizontal half red. If pilot-boats were directed to carry at the masthead two vertical lights, the upper light to be white, and the lower light red, these vessels would be as effectively distinguished by night as by day, and all difficulty or confusion created by the operation of Rule 8 would be avoided. We cannot understand that there need be any difficulty in the adoption of the suggested regulation. Sec. 25 of the Merchant Shipping Amendment Act of 1862 authorises the Queen in Council, on the recommendation of the Admiralty and the Board of Trade, to annul or modify any of the regulations for preventing collisions at sea, whether they

relate to lights or to navigation. Since the Act of 1862 was passed the regulations have become, it is true, international, and it might be supposed that they could not be altered without the assent of the Maritime States that have adopted them at the instance of our Government; but the pilot service is, in its nature, so purely local and confined in its operation to our shores, that no objection could properly be taken by any foreign State to any alteration in the regulations affecting that service, which the authorities might think proper to adopt. But, at any rate, it is a point well worthy of the consideration of the official Committee on the Rule of the Road (which, we believe, has not yet completed its labours), and it would be easy enough for them to make provision for placing pilot-cutters on equal terms with other vessels under way, and, at the same time, for giving them some distinctive feature by which they would be generally known at night as pilot-cutters. It is for the interest of shipping, whether British or foreign, navigating our shores, that pilots should be available whenever needed, and pilot-boats easily distinguishable from other vessels; and the pilots themselves must also be deeply interested in this matter, the collision between the *Severn* and the *Edinburgh* having proved fatal to 15 persons, 10 of whom were pilots.

THE PORT OF LE HAVRE.

THE Seine, although by no means the largest river in France, is the most widely known from the circumstance that the capital city was built and has continued to flourish upon its banks; so that, wherever the name of Paris is mentioned, the Seine is associated, in like manner as London and "Father Thames" have become allied together and have mutually contributed to each other's prosperity. Throughout its numerous windings, which extend over nearly 350 miles of navigable waters, there are several flourishing commercial cities and towns, as Rouen, Elbœuf, Troyes, Melun and

Montorçan, with Chatillon, Bar, Nogent, Corbeil, St. Germains and Honfleur; and at its mouth is Havre, which, with the exception of Marseilles, is the first commercial port of France.

The former importance of Harfleur, and its influence upon maritime enterprise, seem scarcely credible at the present day. This port is now filled up by sands washed in continually by the action of the tide. It was here, in the middle of the seventeenth century, a seventy gun ship called the *Rouen* was lost in the quick-sands. The deposits brought down by the stream of the Lézarde have contracted its bed and formed a fringe of land along the shore of the Seine, which has gradually increased the distance between Harfleur and the estuary. If Havre had not employed all the resources of science to maintain its communications open with the sea, it would in turn have declined, and some other town would have taken its place as the port of the mouth of the Seine. "The changes" says Turner, in his picturesque tour, "that have taken place in the aspect of the coast are on a scale so great as to strike the traveller with awe. While wandering along the embouchure of the little river Lézarde, in vain he endeavours to discover the roads where the navy of our Henry V. once floated in triumph. He ascends the beautiful and quiet stream in search of the place which Monstrelet calls '*le souverain port de Normandie*,' and arrives at a small, neat *inland* town, without harbour, without fortifications, and surrounded with rich pastures filled with grazing cattle. Yet the ships of Harfleur once sailed beyond the tropics."

The like fate might have befallen Honfleur, similarly situated upon the opposite bank of the river. This modest little port has long since been deprived of its distant sea traffic, although its seamen had crossed the Atlantic and founded Quebec before the existence of the rival city of Havre. It has been sometimes feared that, by the effacement of the channel, its complete extinction would have taken place, and this would probably have been the case had it not been imperative, at any cost, to maintain an opening to the sea for the immense quantities of vegetables, fruits, fowls and eggs, which pass through from the productive districts of Normandy to the English market.

The Seine at its mouth is about seven miles in width, and the

tide is usually perceptible as high as Rouen, to which city the river is navigable for vessels of 200 tons. The stream is sluggish and well adapted for a water highway, but it presents the curious phenomenon of an occasional tidal wave which comes in conflict with the running stream. This occurs at the season of the highest tides, when special trains from Paris and Rouen convey many thousands of persons who crowd the quays of Caudebec and Villequier for the purpose of witnessing the spectacle.

At Havre, the rise of the tide is from 21 to 27 feet, and by taking advantage of it the largest class of merchantmen enter the port. There are two roadsteads; the greater, or outer, is about a league from the port, and the little, or inner, roadstead about half-a-league. They are separated by the sand-bank called *l'Eclat*, between which and the bank called *Les Hauts de la Rade*, is the west passage to the port. In the great road there are 6 to 7½ fathoms water at ebb, and in the little, from 3 to 3½. Large vessels always lie in the former. The water in the harbour does not begin perceptibly to subside till about three hours after high-water, a peculiarity ascribed to the currents down the Seine, running across the entrance to the harbour, being sufficiently powerful to dam up for a while the water in the latter. Large fleets, taking advantage of this circumstance, are able to leave the port in a single tide and get to sea, even though the wind should be unfavourable. The harbour consists of the Avant-Port or tidal harbour, and six floating docks: the *Bassin de la Barre* on the north, out of which open the *Bassin du Commerce* and the *Bassin Vauban;* whilst on the south are the *Bassin de la Floride*, the *Bassin de l'Eure*, the largest of all, destined for the large Atlantic steamers, and communicating with the *Bassin* or *Dock Entrepôt*, which is surrounded by bonded warehouses. A large dry dock has also been built. The principal foreign trade is with America; numerous large liners usually lie alongside the quays. The water detained by a sluice, and discharged at ebb tide, clears the entrance of the harbour and prevents accumulations of filth. Two lighthouses, 50 feet high, 325 feet apart, and exhibiting powerful fixed electric lights, stand on Cape la Hève, a promontory about two miles N.N.W. of Havre, and 390 feet above the level of the sea; and there is also a brilliant

harbour light at the entrance of the port, on the extremity of the western jetty.

The town is modern, owing its foundation to Francis I. (1516), and its prosperity to the judicious enactments of Louis XVI., and has since that time been rapidly gaining upon its elder rivals, Bordeaux and Nantes. The saying of Napoleon, that "Paris, Rouen, and Havre, formed only one city, of which the Seine was the highway," explains the cause of the prosperity of Havre. It is the place of import of all the foreign articles needed for the supply of the French metropolis; like Liverpool with us, it is the chief cotton port of France, furnishing this commodity to the manufacturers of Rouen, Lille, St. Quentin, and even as far as Alsace, and from these cities it again receives the manufactured goods for exportation.

The number of vessels that entered the port in 1877 was 2,830, with a tonnage of 1,575,329 tons. Of these 1,290 vessels with tonnage 621,548 were British, and 602 with tonnage 359,533 were French. The principal cargoes brought were coals, cotton, coffee, hides, wool, sugar, oats, wheat, dyewoods, petroleum, and guano. The number of tons of coal imported in British vessels was 279,840 tons, and by the same means 131,281 bales of cotton. A great change, Consul Bernal observes, has taken place during the last few years in the manner in which much of the trade of the country is carried on. Formerly the merchants of Havre were themselves the importers of the different articles required by the various branches of industry in the interior, whereas now many of the chief manufacturers purchase the raw material they require in the country where it is produced, and it merely passes through Havre in transit, leaving but a small commission on its passage. On the important question—important to the old established firms of Havre—whether this system will continue, various opinions prevail. While some persons think the manufacturer will find it cheaper to continue thus to be himself the importer of what he requires, others maintain that in the long run—and especially in regard to such articles as cotton—he will see himself exposed to vexatious and unprofitable disputes and law suits, and that he will become convinced it is to his advantage to purchase on

the spot from responsible houses, whatever raw materials are used by him, whenever he may need them. Though important to the merchants of Havre, the question is one that does not materially affect the nation at large, which is of course only interested in seeing the general trade and prosperity of the country continue to increase.

The coasting trade, wherein 3,095 French vessels, with 278,873 tons, were entered in 1877, has very largely increased of late years, as is proved by the great increase of French wines, soaps, and other produce imported at Paris from Havre. The coasting vessels in many cases transfer their cargoes to large barges, called *chalauds*, which are towed by steam as far as Rouen, and by horses for the rest of the way to Paris.

CUSTOM HOUSES.—No. XII.

IN former papers we have traced the legislative history of the English Custom House: detailed its administrative modifications: set forth some of the extraneous duties which the officials perform: and, lastly, dissected the evidence of the Committee of 1862-3 bearing upon the fusion of the two Boards of Customs and Inland Revenue. It would be seen that this most desirable union was very nearly obtained; and it is a surprising fact that over fifteen years have elapsed without any further parliamentary step having been taken towards it.

Let us now look at this question from one or two aspects afforded us by the tariff and the estimates.

The tariff of to-day gives about 48 headings under which Customs' duties are levied; but nearly the whole amount of revenue received thereby is derived from only seven generic articles of assessment. The tariff of 1860 contained over 400 headings, and that of 1840 about 1,200. In the Inland Revenue department it appears that the principal divisions of its tariff are numbered as follows:—

Excise Duties	5
Do. Licenses, about	20
Stamps, about	29
Taxes, ,, ...	4

It is, therefore, obvious, that if a set of officers under the old Customs' Board of forty years ago, could deal with more than a thousand dutiable articles, those men, under the four united Boards, could satisfactorily assess less than a hundred items liable to pay revenue. Turning to the question of unwieldiness, in respect of the numbers employed, it will be seen on a reference to the Civil Service Estimates, that the Post Office employs as many officials as both combined. In round numbers they may be taken as under :—

Customs	5,000	employés.
Inland Revenue	5,500	do.
	10,500	
Post Office	10,500	do.
Total Revenue Departments	21,000	do.

There is no complaint that the Postmaster-General cannot sufficiently control the thousands under him, and it is therefore to be presumed that the same success would attend the united Boards of Customs and Inland Revenue.

Regarding the amount collected, and the expenditure to collect it, it is of importance to note that in the financial year ended 31st March, 1878—

The Customs collected ...	£19,969,000
The Inland Revenue collected	27,464,000
The total being	£47,433,000

Now, the amounts voted to do this, were—

Customs	£978,315
Inland Revenue	1,788,850
Total	£2,767,165

The percentage of collection was, therefore—

Customs	£4 18 0
Inland Revenue	6 9 6
Total	£5 5 10

But the average expense (not the average salary) per man, was—

For Customs	£195 per annum.
For Inland Revenue	307 do.

The average salary given, appears to be, for—

Customs	£150 per annum.
Inland	200 do.

Taking the figures as they stand in the Estimates, it is seen that the Customs collect at a cheaper rate by 1½ per cent. It is singular, too, that a large part of the amount collected by the Inland Revenue Department is from direct taxation, which ought to cost much less than the indirect, of which the Customs' collection is solely made up. The inference is, that either the one service is worse paid than the other; or, that the "other" does not do its work so well. The argument is no less strong if we turn to the individual ports or places for a comparison. For instance, at Belfast, there is a Customs' staff of 68 whose expenses amount to £9,750, and 33 Inland Revenue Officers are also stationed there, at a yearly expenditure of over £5,000. The relations of these two classes are intimate and, necessarily, interchangeable. They are, for the most part, located under the same roof. About two-thirds of the revenue collected at the Custom House is for the Inland Revenue—being about a million sterling for British spirits alone—the gauging, removing under bond, racking, blending, and other operations with this liquor, must have occupied the time and attention of some of both classes of officials. They would have to send "Despatches" to each other, and correspond, more or less, about the business in hand. But if amalgamation were to take place, a good deal of unnecessary work would be saved, and greater convenience would be gained for the public in dealing with one head. At Glasgow, a similar state of things exists. There, there are 117 Customs' men

receiving £16,670 per annum, and 98 Inland Revenue officials, probably in receipt of about £15,000. Were only one collector placed there instead of two, the probability is that the expense of one would be saved. At Bradford, an Inland Bonding place, there are—Customs, 5 men, £700 per annum; Inland Revenue, 5 men, £900 per annum. That the whole of the Customs' business could be done by the Excisemen, is pretty obvious, for the Customs' duties consist simply of assessing casks of spirits, &c., in bond, and receiving the duty at the Custom House. Even if the whole five men could not be spared, the probability is that some of them would not be required. If we take another class of port, Cardiff, the same inference may be drawn. The Customs' staff there numbers 54, and the salaries £7,020. The Inland Revenue staff numbers 27 at an expense of about £4,500. But this staff covers the "Collection" extending from Cardiff, on the west, to Lydney on the east, and Merthyr and Abergavenny on the north side. The officers stationed at Cardiff are, the Collector and four other officers. The officers for both departments are in different streets and quite distinct, and any business done between them must be conducted by correspondence. Despatches and letters must pass regarding the removal or assessment for duty of British spirits, foreign wines, exportation of beer, &c., just as if they were utter strangers. This gap is not so wide as formerly, and, as far as it can be done under the present system, the duplicate work is reduced to a minimum. This reform was effected after the exposure of the evidence of the Committee of 1862. There is surely no reason why the Collector of Customs at Cardiff could not collect all the duties of the Inland Revenue with a small addition to his present staff. It may be said that the logical conclusion of such an argument is to unite all government offices together. And such is the fact. The time will probably come when, in the provinces at all events, all such offices will be united under one head, with "branches" on the post office principle. In the Appendix to the Report of Mr. Horsfall's Committee of 1863, a list of ports is given by one of the witnesses where collectors of Customs and Inland Revenue, and distributors of stamps are stationed, each in their several capacities performing duties

all of which might be well done by one of them. It may be useful to give a summary of this return. It comprises—

41	Collectors of Customs, Salaries	...	£20,550
43	Do. Inland Revenue, Salaries		19,810
38	Stamp Distributors, Poundage	...	21,583
	Total	...	£61,943

And the witness significantly adds that he might have given other five ports bringing up the total to £65,278. It is not probable that two-thirds, or even one-half of this large sum, could be saved to the nation; but even if £10,000 could be secured, or, even, if the outlay could be divided amongst a less number of officials, great benefit would be derived from the fusion of the two offices. In *Loftus*' Almanack will be found a list of warehouses which indicates the same system of duplication of work and waste. On one page there is a list of 130 Excise warehouses, and on the next page, 117 Customs' warehouses. In Scotland and Ireland nearly all the ports mentioned have warehouses under each department, but, in England, there are only a few ports where that is the case. Probably it arises from the fact that British spirits are now warehoused in Customs' warehouses, and foreign spirits and wines in Excise warehouses as required. This step has answered extremely well, and is a decided advance towards the amalgamation.

The objections that have been urged, from time to time, against the proposed union have been: (1.) That it would be impossible to get a man of sufficient ability and experience as chairman to manage so large a business. Now, in the first place, the chairman is not the sole manager and responsible agent for the working of the machine. He divides his work and his responsibility with others who form part of the "Board." The same objection would apply to the Prime Minister of England, the President of the United States, or even to any principal Secretary of State. Besides, is it not the fact, that many chairmen of both Customs and Inland Revenue have been in office in the past, who had no experience before appointment to guide them in their official work? Such an objection is untenable.

(2.) It is also objected that the officers of both departments are so fully employed that any curtailment of their number would be an injury to the public interest. In reply to this statement, we would say that it does seem idle to assert that where two offices with analogous duties are centralised, all the officials would find as much work to do as before the union took place. The fact is, that there is necessarily a good deal of idle time on the hands of many officials. It must be so to suit the exigencies of business, and, sometimes, yea, often, it happens that one class of officials are busy when others are doing nothing. It ought to be the object of every principal of any Government establishment so to place his men that they can assist each other interchangeably. Such would be the case were the union of these two bodies to take place. At present, Customs' men are sometimes idle when Excisemen are busy, and *vice versa*, and often they are both idle together. Once, however, the centralisation took place, the effect would be to make a redistribution of labour and effect a considerable economy. Take, for instance, a cask of beer for exportation; certain Customs' formalities are gone through to accomplish it if warehoused in a Customs' warehouse, and, afterwards, the Excise have to collect documents and write it off. Well, if the Exciseman had been a Customs' officer, or, rather, a cross between himself and the other, he would have saved a good deal of trouble by doing the whole thing at once.

(3.) It is alleged that were the two Boards united the departments would be as distinct as ever; and the amalgamated Boards of Excise, Stamp, and Taxes are pointed to as specimens. Now, it may or may not be the case that those three departments are as distinct and separate as ever: it may be true even that in the out-door staff the separation and numbers are the same as ever. But were anyone to propose that those Boards should be again disintegrated, how would his proposition be received? It would not be tolerated for a moment. It is admitted that the union of those Boards saved money, not only in the amounts paid to them, but in the managing or superintending departments as well. And, doubtless, the same effect would ensue were one solid "Revenue Board" constituted, if no other saving should happen. For

instance, the expense of the Board and superintending establishments of the Customs and Inland Revenue are, according to the Civil Service estimates, as follows:—

CUSTOMS.

Board (Four Members or Commissioners) ...	£5,900
Secretary's Office	13,570
Solicitor's Office	5,740
Accountant and Controller-General's Office	15,755
Statistical Department	20,340
Writers, &c.	1,600
Total	£62,905

INLAND REVENUE.

Board (Five Commissioners)	£7,230
Secretary's Office	30,017
Solicitor's Office	14,060
Accountant and Controller-General's Office	25,751
Controller of Legacy and Succession Duties' Office	42,553
Receiver-General's Office	6,830
Total	£126,441

Both together, make up a sum of £189,346; out of which surely some very considerable amount could be saved were a union of all those offices to take place. That such will be the case, and perhaps, not very long hence, seems to us a foregone conclusion. The consolidation of former Boards as already stated; the use of Customs' warehouses for Excise purposes, and *vice versa;* the sale of Inland Revenue Stamps, and the issue of certain Licenses at the Post Office, all tend to amalgamation, and to the breaking down of the ancient barriers between those kindred departments. In the *Financial Reform Almanack* there is yearly published a list, headed, "Curiosities of the Customs." It shows that at many Custom Houses little or no revenue is taken, but that large expenses are incurred. This list is ofton quoted by

ill-informed newspapers and even members of Parliament, who do not take into account the many other duties that Customs' officers have to perform. Were, however, an amalgamation to take place with the Inland Revenue, and a proper allocution of duties to ensue, such an *exposé* could not be made, for every Custom House would be subordinated to a district, and each officer have an allotted duty, which would be returned as such in the reports of his principal. In the same publication it is stated that, notwithstanding the repeal of twenty-five millions sterling of Excise and Customs' duties since 1840, they still contribute nearly two-thirds of the revenue, and being from indirect sources, press mainly on the masses of the people. It is argued that so long as this is the case the cry of free trade is a mere mockery. But without repealing any more of these taxes, a consolidation of the means of getting them would not only cheapen them, but render their incidence more easy to bear, by releasing the unproductive labour both of the officials and the public generally.

THE ACTION OF SCREW PROPELLERS.

USEFUL NOTES FOR MASTERS AND OFFICERS OF SCREW STEAMERS.

Q. Describe a right and left-handed screw propeller ?

A. A right-handed screw propeller revolves from port to starboard over the top centre, and a left-handed revolves from starboard to port.

Q. How is this knowledge essential in handling a screw steamer ?

A. A right-handed propeller, going continuously ahead, will turn a vessel round faster under the starboard than under the port helm ; but where she has to reverse and turn short round, she should be canted with her head to starboard. Backing the engines has a contrary and greater effect. Should the screw be a left-handed one the reverse will follow, viz., she will turn faster going continuously under a port helm than under a starboard

helm; but should she have to reverse and turn short round, she will cant with her head to port. A right-handed screw steamer, going ahead with her helm amidships, will revolve to port, but when going astern her head will fall to starboard, irrespective of the position of the rudder, and the reverse will occur with a left-handed propeller.

Q. What does this teach you to guard against?

A. With a careless helmsman a screw steamer is apt to run to port or starboard of her course, as she has a right or left-handed propeller, and as most vessels are fitted with right-handed screws, and as the port helm is that in use when meeting end on or nearly end on, it should be used in ample time; also when crossing a vessel's track which is to starboard, should it be intended to pass under her stern. If, however, a vessel is near on the starboard bow, it would in most cases be preferable to starboard, knowing that the ship would answer her helm much quicker if she did not stop and reverse.

Glasgow, March, 1879. W. C.

THE CASES OF THE "DORA" AND "BALMORAL."

THE judicial decisions given in both these cases are of the highest importance to shipowners. In both trials the questions at issue had direct reference to the exercise of the powers conferred on the Board of Trade by Acts of Parliament passed under the influence of the Plimsoll agitation, a subject which we claim some authority to discuss. But as it is not our practice to deal with any subject until litigation thereon is at an end, and as the judgment in the case of the *Dora* has been appealed against, we do not think it right for the present to discuss the decisions arrived at. Moreover, we prefer to wait until any heat which may have been aroused in connection with the questions at issue shall have subsided, in order that the subject may be calmly and dispassionately considered. We hope to be able to deal with the subject at length in our next number.

THE FISHERIES OF NORWAY.

FOR the greater portion of its extent the Norwegian coast is protected from the fury of the ocean by a fringe of islands, which act as breakwaters, especially when they form a close chain. There are myriads of these islands, of all sizes—the majority barren or only used for pasturage—from a mere projecting reef to territories larger than the Isle of Man. The Lofoden group present an appearance that excites the admiration of the voyager amidst the wonderful scenery of these high latitudes. There are five larger and several smaller islands, having in all about three or four thousand inhabitants. The principal are Andoën, Langoën, and Hindoën, the latter being the largest of the whole group. The coasts of these islands are extremely irregular, and they rise into lofty and rugged mountains covered with perpetual snow and in some places with glaciers.

Amongst the contributions to the Alpine Club there is a description by Mr. Campbell of his travels in Norway, wherein he says, that "soon after leaving the little town of Bodö the steamer crosses an open sea, conventionally called the Vestfjord, to the Lofoden Islands. This most remarkable group, appearing from a distance like one continuous land, or, as Murray says, " a row of shark's teeth, is a very labyrinth of mountain and sea, the tortuous passages between the islands being in many places mere rivers in breadth. Conceive a block of high land capped by peaks of the wildest form, and the whole submerged to above the plateaux, and you have an idea of the scene. The cliffs generally rise precipitately, void of strand or beach, from the wave. They are not altogether barren; herbage and often scraggy birch grow in streaks among the crags. The highest point is said to be Vaage Kallen, an inaccessible aiguille, between two and three thousand feet high. The Maelström, about which so much fiction has been penned, lies between two little islands at the south end of the chain. The Lofotenöer are the seat of the cod fishery in February and March, and the population, confined to the coasts, are all connected with it, and many of them well-to-do."

In the beginning of February the cod fish set in from the ocean,

and occupy the banks in West Fiord; the fish crowd so much together while depositing their spawn, that it is said a deep sea lead is often interrupted in its descent to the bottom through these *fish hills*. The fishermen assemble in the month of January at the different stations, and the fish are caught by nets and long lines, set at night and taken up in the morning. An outfit, or company, consists of two boats, each having five men, and provided with six or eight nets; and every twenty or thirty of these companies have a large tender to bring out their provisions, nets, and lines, and to take the produce to market. About 20,000 men are employed in about 3,000 boats and tenders, and the average take of fish is estimated at 21,000,000, yielding upwards of 22,000 barrels of cod liver oil, and 6,000 barrels of cods' roe. The fishing banks are three ledges, the first lying at a depth of about 30 fathoms, the second at 45, the third at 120, and beyond there is no sounding at 300 fathoms. The fishery is exclusively carried on in open boats. The fishermen hang up the larger portion of the fish, which is dried and ready for shipment about midsummer; this is stock fish. A considerable quantity is, however, sold fresh to the traders of Tromsö, Trondhjein, Christiansand, Molde, and Bergen, who enjoy, in common with the privileged merchants of the district, the right of trading during the fishing season; this they salt down in their vessels, and afterwards convey to particular places along the neighbouring coast, where the climate is less humid than in the Lofoden, and also where there is facility for drying it on the flat rocks. Of late years the cod fishery has been extended north to Vardo, and a second take is made as late as June, after the usual Lofoden fishery has terminated.

Vice-Consul Crowe states that the year 1877 was remarkable for the large profits realised by the cod fisheries, and it may with certainty be said that such an abundant and profitable season has never before taken place on the Norwegian coast. The principal cod fishery, the Lofoden, which generally closes with a catch of 19,000,000 to 20,000,000 fish, this year yielded as many as 29,500,000, being 5,500,000 more than was taken in 1860—the greatest on record. The cod fisheries of Vœrö and Helgoland gave

4,500,000, bringing the total result of the Lofoden fisheries up to 34,000,000. Of the quantity caught at Lofoden it is presumed that 500,000 was consumed on the spot by the fishermen, 24,500,000 salted, and 4,500,000 dried. The following table shows the relative proportion of fish salted and dried during the last five years:—

	Fish Caught. Millions.	Salted. Millions.	Dried. Millions.
1873	19½	11½	7½
1874	16	11½	4
1875	23	15	7½
1876	22	16	5½
1877	29½	24½	5

Besides the above, 27,000 barrels of roe and 60,000 barrels of liver were produced; the latter representing about 30,000 barrels of oil.

The second in importance is the Finmarken cod-fishery. This also was unusually profitable, the total catch for the season having been 17,500,000, while that of the year previous was only about 5,000,000; the average annual yield, however, is about 15,000,000. Of the quantity caught, half was prepared as stock fish, and the other half salted; 48,000 barrels of cod liver oil were produced, but no roes, as the cod do not spawn at the time they visit that part of the Norwegian coast. The results were divided as follows:—

	Number of Fish.
In the districts of Alten	630,000
,, ,, Hammerfest ...	8,190,000
,, ,, Tanen	3,196,000
,, ,, Vardö	4,500,000
,, ,, Varanger	1,120,000

The following cod fisheries were also more than usually profitable during the year 1877, and yielded as follows:—

	Number of Fish.
Sondmore	4,500,000
Nordmore	2,500,000
Fosen	1,750,000
Namdalen	1,000,000
Romsdal	880,000

The total catch of the cod fisheries is therefore estimated at 62,000,000 marketable fish, which is about a quarter above the average. Besides the foregoing, there is a considerable summer and autumn cod fishery carried on in the Varanger Fiord, which is of great importance to the inhabitants of those shores, as the Russians in exchange for fish, bring meal, corn, and other stores, which essentially contribute to the maintenance of the population during the long winter months which prevail in those regions.

Since the total failure of the great ordinary spring herring fishery—which for generations formed one of the most important sources of income for the country—it appears that the small summer herring has made its appearance all along the coast from Stavanger as far north as Finmarken, and latterly increased; but as this fishery is at present uncertain, fluctuating, and dispersed, it is not under Government inspection, and therefore no trustworthy information relative to it is obtained. The Government, however, have now completed a telegraphic line 200 kilometres in length, composed chiefly of submarine cables, by means of which the fishers along the whole coast are enabled to gather at once on the approach of shoals to any particular fiord. As is well known, in the good herring time, great shoals come from the depths of the sea to deposit their spawn in the Norwegian fiords. It frequently happens that the object of the visit is accomplished, and they return to the ocean before news of their arrival reaches the fishers on distant parts of the coast; but should the herring fishery return, this difficulty is now obviated by the construction of the telegraph lines in question.

The quantity of mackerel caught greatly exceeded the previous year, although the price was very low, owing to the abundant mackerel fishery along the English coast, the value, *i.e.*, 407,000 kroner, is still nearly double that of 1876. No definite information can at present be obtained regarding the salmon, lobster, and other minor fisheries.

The port of Tonsburg equipped a small fleet of 17 vessels to pursue the seal fishery off the coast of Greenland; they returned with the following results:—

	Number.
Skins	39,638
Old seals	12,363
Young seals	20,893
Barrels of seal blubber	10,920
Bears	12
Whales	10

The fishery has been on the whole a very profitable one, and some vessels were especially fortunate in their venture. No complaints seem to have been made respecting the enforcement of the new Seal Fishery Law which came into operation. The Norwegian traders seem well satisfied with it, and fully understand the benefit it will confer upon the fishery in general.

CORRESPONDENCE.

CHATHAM ISLANDS IN THE SOUTH PACIFIC.

To the Editor of the "Nautical Magazine."

Sir,—With reference to my article on the Chatham Islands, which appeared in the *Nautical Magazine*, volume for 1878, November number, I stated (p. 1015) that I considered it possible that Motuhope, lying 9 miles in an easterly direction from the northern extremity of Rangiauria, might possibly be the Round Island which H.M.S. *Brisk* had reported to be placed on charts about 4 miles too far to N.W. It will interest your readers to know that my conjecture is right, as indicated in a letter received by Messrs. Imray and Son from Mr. S. Percy Smith, Chief of the New Zealand Survey Department.

I am, yours very truly, W. H. ROSSER.

Nautical Academy, 18, John St., Minories.

"PORT" AND "STARBOARD."

To the Editor of the "Nautical Magazine."

Dear Sir,—I was much pleased and edified at reading in your March number an article on the terms "Port" and "Starboard" by "A. J. G. C." His views and mine are identical on that important point, and I see no reason why the words "Port" and

"Starboard" should be altered to please the uninitiated, when it is so well known to the practical seaman. I should be indeed sorry to see it altered for one, for I am convinced it would cause serious mistakes, particularly at first.

My officers are of the same opinion as myself.

I am, Sir, yours truly,

WILLIAM WOOLCOTT,

Commander P. & O. S. S. *Pekin*, 3,777 tons.

March 19th, 1879.

PROPOSED REVERSAL OF STEERING WHEEL.

To the Editor of the "Nautical Magazine."

SIR,—In the course of no mean length of service I do not remember to have heard any of the great seamen of the day recommend an innovation on the present method of reeving wheel ropes, and the consequent action of the wheel; I say wheel, because it is no more incumbent on the helmsman to be familiar with the action of the rudder than with the principles which regulate the latent heat of steam. Such being the case, the sole element to be considered is the movement of the ship's head and steering wheel, and why the former should not move without the latter, as it now does, in lieu of the opposite direction, is difficult to infer. It reminds one of that charitable old lady, who said, when the topsails were being mastheaded, "Who can be surprised at the poor dear sailors swearing so, when the harder they pull at the strings the higher the sheets go up."

The only case quoted which by any means can be brought to bear on it is that of the *Grosser Kurfürst*. Unfortunately for the cause the German sailors, who were steering a German ship in charge of German officers, are, in their own country, used to the reversed motion of the wheel, but so far as the evidence goes there is nothing to show that a different result would have ensued however the power might have been applied. Seamen are well aware that, on occasions of great emergency, men at the wheel are apt to "lose their heads;" and in this particular instance, as there were many acting, it is possible that such was the case. The true cause of the loss of that ship, and the gallant men who

formed her crew, is not far to seek; but, we may rest assured, that to whatever it may be due, a reversed wheel motion did not make one of the factors. Of all places in the world the navigation on the Thames is most difficult, requiring the most perfect command over a vessel at all times. Such being the case, we should naturally seek for collisions amongst the fleets of long steamers which are constantly plying on all the reaches of the river, but it is scarcely too much to say that there is no instance on record of an accident from this cause.

Of course, the eye and the hand can be educated to adopt any particular action, but when once learned, it would introduce uncertainty everywhere to attempt to make a radical change. If it were possible to bring all the seamen of the world together, and lay down an universal law, it is certain that accidents would increase for a considerable time afterwards, and probably not decrease at all. Of all peoples the English are naturally the most opposed to change, even when its necessity is obvious, and certainly the men who may attempt to alter the existing steering rules, have a task before them which will tax alike their professional and their persuasive powers.

Yours faithfully, W.

APPARENT AND TRUE DIRECTION OF WIND WHEN SAILING.

To the Editor of the "Nautical Magazine."

Sir,—In your July number for 1878, you kindly answered my question on "Apparent and True Direction of Wind when Sailing." I purposed to have followed it up with another, but sailed before I saw the first answered. My next question is—

Can a ship, which can only sail when close-hauled 66° from apparent direction of wind, whose apparent velocity is 28 miles an hour, beat to windward; and how near to the apparent direction of wind (velocity the same) must a ship lie in order that her gain should be 47 per cent. (supposing her to make no leeway)?

Yours, &c.,

April, 1879. SHIPMASTER.

[We regret that our correspondent's inquiry is not sufficiently clear to enable us to give a definite answer. If he still desires

the question to be answered we shall be glad if he will state what he means in the expression "in order that her gain should be 47 per cent."—47 per cent. on what? Also will he explain what his views are about beating to windward? Opinions vary very much on this point.—Ed. *N. M.*]

BOOKS RECEIVED.

Quarterly Weather Report of the Meteorological Office; Part IV., October-December, 1875. London: J. D. Potter, 31, Poultry; E. Stanford, Charing Cross. 1879.

The usual tables of barometrical pressure, temperature, rainfall, &c., for the period indicated are given in this report, with full analysis of the general meteorological character of the three months. There is a large increase in the number and variety of the Appendices, and some of these are exceedingly valuable. The monthly summaries are given in accordance with the forms recommended for international adoption by the Permanent Committee of the Vienna Congress on Meteorology.

Annuaire des Courants de Marée de la Manche pour l'An 1879, par M. Gaussin, Ingénieur-Hydrographe de 1re. classe, publié sous le Ministère de son Exc. M. le Vice-Admiral Pothuan, Ministre Secrétaire d'Etat de la Marine et des Colonies. Paris.

Of the many Annuaires issued in France, and several of them are very good, not one can be considered so valuable as that we now announce, relating to the tidal currents of the English Channel. As might be expected, it is a compilation; but no source of information has been neglected; home and foreign authorities have been equally laid under contribution, and the material reduced and correlated for the whole year for every ten square miles of latitude and longitude in the Channel. Thus, from this work, the seaman, knowing the part of the Channel where his ship is, can, at any moment of flood or ebb, determine the direction and velocity of the stream, and ascertain other important data by which to check his soundings and set his course.

Tables for Rapid Calculations of Latitude and Longitude in various ways; also Methods of Finding Time of High Water and Variations of Compass, &c. Prepared by John M. Beverly, United States Coast Pilot. Boston: Rand, Avery & Co.

TABLES similar to these have frequently come under our notice, but they cannot be recommended. Breusing, when he first published his "Steuermannskunst," issued a set of tables to four places of decimals in the logs.; but this was found to be a great detriment to an otherwise excellent work on navigation, and he speedily published tables to five places—the least that can be adopted for precision. It cannot be considered otherwise than indiscreet to use logs. which often differ only by 1 or 2 for 5 seconds of the hour angle. Our readers already know our objections to "finding longitude by equal altitudes of the sun." On an inquiry before the Wreck Commissioner into the loss of a vessel, the master's certificate would be in jeopardy, if the position had been determined by no better method than this. Finally, the method of "finding the time of high water by the moon's age" is a very old method, and, at best, only a very rough estimate; the time may be in error from one to two hours.

Dizionario Nautico e Tecnico di Marina: Nautischtechnisches Wörterbuch der Marine. Compilato da P. E. Dabovich, F. R. Tecnico Navale. Pola.

THIS is not a Dictionary explanatory of the technical terms used in connection with shipping, but a Dictionary (or rather Word-book) of equivalent nautical terms in four languages, viz., Italian, German, French, and English. Its scope is wide, extending beyond navigation, nautical astronomy, and seamanship, so as to include hydrography, shipbuilding, naval tactics, trade and commerce, &c. We have carefully looked through the part to hand, and while the Italian, German, and French equivalents appear to be unexceptionable, the English will require some revision in a new edition. There is at present no really good work of the kind, and if this be compiled with judgment, it will be of considerable service to a large circle of students and general readers.

Entscheidungen des Oberseeamts und der Seeämter des Deutschen Reichs: herausgegeben im Reichskanzler-Amt. Hamburg: L. Friederichsen & Co. 1879.

It appears that the decisions arrived at, and judgments delivered, in the Marine Courts of the German Empire, respecting maritime disasters, are published from time to time; and the book before us is the second part of the first volume. A collection of such judgments may not be pleasant reading, but we have no doubt that if masters of British vessels, when at sea, spent some of their time in the perusal of the various cases of disaster and collision that occur, and studied the decisions of the Wreck Commissioner's Court respecting them, they would do so to their benefit, and the suspension of fewer certificates might be the result. We think the Germans are right in collecting and arranging the decisions that are given in the Maritime and Consular Courts of the Empire. In our own columns month by month we publish a summary of the official inquiries held with respect to casualties to British vessels, but we think that the official publication of the full text of the decisions in a book form might be of great service to many, and full of warning to those who are liable to be called upon to answer for maritime disasters.

Technological Dictionary. English—German—French. Third edition, completely revised and corrected. Wiesbaden: J. F. Bergmann. London: Trübner and Co. 1878.

The first edition of this really valuable work was brought out in 1853, the idea of publishing a technological dictionary in the three principal languages of Europe having originated with Mr. J. A. Beil, of Hanover. In 1870, a second edition was published, and now we have before us a copy of the third edition, dated 1878.

The merits of this great work cannot be sufficiently dealt with in the limited space at our command, but we may inform our readers that the work has been conscientiously and ably prepared, that it comprehends the technicology of all branches of science, art, and industry, and that it is without doubt a most useful dictionary for reference.

In the present edition it appears that some special attention has

been given to maritime terms, and that with the assistance of Admiral Smyth's *Sailor's Word Book*, all nautical words and phrases have been thoroughly overhauled, and a great number of new terms and expressions added. This should give the work special value in the eyes of our readers, for there are, no doubt, many who in reading works on nautical subjects, in French or German, have often felt the utter uselessness of an ordinary dictionary to convey the meaning of some technical expression. Again, when in foreign ports captains probably often experience the want of being able to give expression in French or German to some requirement for which there is no provision in the ordinary dictionary.

One further word of praise we have for this work, viz., that it is admirably arranged. In many cases the bare word is supplemented by all its relating compounds, and the different modes in which it may be applied in phrases. This of course considerably enhances its value as a reference dictionary.

Die Ertragsfähigkeit eines Schleswig-Holsteinischen Seeschiff-fahrt-Kanals. Erläutert auf Grund einer statistischen Bearbeitung des Sund-Verkehrs von H. Dahlström, &c., &c. Hamburgh: L. Friederichsen & Co. 1879.

Briefly put, this is a pamphlet on "A Schleswig-Holstein ship-canal as a commercial speculation." The project of a canal to unite the North Sea with the Baltic is not a new one, in fact has been frequently mooted, but never with so much elaboration and with so many statistics as in the work before us. In the present instance it is proposed to carry the canal from St. Margarethen on the Elbe, to Kckernförde in the Baltic, and by the way of Rendsburg, as originally projected in 1865; thus the entire navigation of the Jutland peninsula would be saved, and the dangers of the Sound, Grounds, and Belts avoided. Constructed on the dimensions stated in the pamphlet such a canal would admit the passage of the largest vessels, and if the toll were reasonable it ought, taking into consideration the immense traffic through the Baltic, to pay a moderate dividend on the outlay.

TIDE TABLES FOR MAY, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge.		Hull.		North Shields		Leith.		Devonport.		Dover.		Weston-super-Mare.		Liverpool.		Greenock.		Queenstown		Kingstown.		Londonderry.		Brest.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Th	1	8 50	9 31	1 18	1 53	10 57	11 32	9 52	10 25	—	0 42	5 56	6 29	1 12	1 49	6 21	6 58	6 52	7 28	—	0 14	6 14	6 46	3 33	4 3	11 15	11 49
F	2	10 8	10 41	2 26	2 57	—	0 2	10 55	11 23	1 22	2 0	7 2	7 35	2 23	2 57	7 30	8 0	8 1	8 32	0 48	1 21	7 16	7 45	4 28	4 51	—	0 20
S	3	11 12	11 40	3 25	3 52	0 30	0 55	11 49	—	2 35	3 4	8 4	8 30	3 30	4 1	8 27	8 51	9 1	9 28	1 51	2 20	8 13	8 40	5 12	5 33	0 48	1 15
S	4	—	0 6	4 17	4 42	1 18	1 41	0 12	0 35	3 30	3 56	8 56	9 21	4 32	5 0	9 15	9 38	9 53	10 18	2 46	3 12	9 7	9 32	5 55	6 18	1 39	2 3
M	5	0 30	0 54	5 4	5 27	2 3	2 25	0 58	1 21	4 21	4 46	9 46	10 12	5 27	5 54	10 1	10 24	10 43	11 9	3 38	4 3	9 54	10 16	6 42	7 6	2 27	2 51
Tu	6	1 18	1 42	5 51	6 16	2 48	3 11	1 45	2 9	5 10	5 34	10 38	11 5	6 21	6 47	10 48	11 13	11 35	—	4 28	4 53	10 39	11 2	7 31	7 56	3 15	3 39
W	7	2 4	2 28	6 41	7 6	3 34	3 58	2 33	2 56	5 58	6 22	11 32	11 58	7 13	7 37	11 38	—	0 1	0 26	5 18	5 43	11 26	11 50	8 18	8 40	4 3	4 27
Th	8	2 53	3 16	7 31	7 55	4 22	4 47	3 19	3 42	6 45	7 8	—	0 24	8 1	8 24	0 3	0 27	0 51	1 16	6 8	6 33	—	0 15	9 2	9 24	4 50	5 14
F	9	3 41	4 5	8 19	8 43	5 12	5 37	4 5	4 30	7 31	7 54	0 50	1 16	8 47	9 10	0 51	1 15	1 41	2 5	6 57	7 21	0 40	1 6	9 47	10 11	5 38	6 2
S	10	4 30	4 55	9 8	9 33	6 3	6 29	4 57	5 24	8 16	8 37	1 42	2 9	9 32	9 54	1 39	2 4	2 29	2 54	7 46	8 11	1 32	1 58	10 37	11 5	6 27	6 53
S	11	5 19	5 45	9 59	10 27	6 56	7 25	5 52	6 22	8 58	9 22	2 36	3 3	10 16	10 38	2 29	2 55	3 19	3 44	8 36	9 1	2 26	2 54	11 40	—	7 21	7 50
M	12	6 12	6 41	11 0	11 34	7 58	8 31	6 53	7 26	9 47	10 17	3 30	3 57	11 2	11 29	3 23	3 53	4 11	4 40	9 27	9 54	3 25	3 56	0 19	0 58	8 19	8 49
Tu	13	7 11	7 42	—	0 10	9 6	9 43	8 0	8 35	10 48	11 21	4 24	4 51	—	0 1	4 25	4 59	5 9	5 41	10 25	10 59	4 30	5 5	1 38	2 20	9 21	9 56
W	14	8 14	8 48	0 45	1 17	10 19	10 51	9 13	9 46	11 58	—	5 20	5 50	0 33	1 6	5 36	6 13	6 14	6 46	11 32	—	5 37	6 8	2 56	3 27	10 30	11 4
Th	15	9 23	9 59	1 47	2 17	11 22	11 51	10 16	10 44	0 34	1 8	6 20	6 50	1 39	2 11	6 48	7 19	7 18	7 49	0 4	0 35	6 37	7 5	3 54	4 20	11 37	—
F	16	10 30	11 0	2 45	3 13	—	0 19	11 12	11 38	1 41	2 13	7 20	7 50	2 43	3 14	7 48	8 16	8 20	8 47	1 6	1 37	7 33	8 0	4 43	5 3	0 7	0 35
S	17	11 28	11 54	3 40	4 5	0 44	1 7	—	0 1	2 41	3 7	8 17	8 40	3 43	4 11	8 39	9 0	9 14	9 38	2 4	2 29	8 26	8 50	5 23	5 42	1 1	1 24
S	18	—	0 18	4 28	4 47	1 27	1 46	0 21	0 40	3 30	3 52	9 1	9 22	4 36	5 0	9 20	9 39	9 59	10 20	2 51	3 13	9 12	9 33	6 1	6 20	1 44	2 4
M	19	0 38	0 57	5 6	5 25	2 5	2 24	0 59	1 18	4 13	4 33	9 43	10 3	5 23	5 45	9 58	10 17	10 40	11 0	3 34	3 54	9 53	10 11	6 39	6 58	2 24	2 43
Tu	20	1 17	1 36	5 44	6 [illegible]	2 42	2 59	1 37	1 56	4 52	5 11	10 23	10 42	6 6	6 26	10 35	10 53	11 20	11 39	4 14	4 32	10 28	10 44	7 17	7 36	3 1	3 18
W	21	1 54	2 10	6 21	6 39	3 16	3 33	2 13	2 30	5 28	5 45	11 1	11 20	6 44	7 2	11 10	11 28	11 58	—	4 50	5 8	11 0	11 17	7 53	8 9	3 35	3 52
Th	22	2 26	2 43	6 56	7 14	3 50	4 7	2 47	3 3	6 2	6 19	11 39	11 58	7 20	7 38	11 46	—	0 16	0 34	5 27	5 46	11 34	11 52	8 25	8 41	4 10	4 28
F	23	3 0	3 18	7 32	7 50	4 24	4 41	3 20	3 37	6 36	6 52	—	0 17	7 55	8 12	0 4	0 22	0 52	1 10	6 4	6 22	—	0 10	8 57	9 13	4 46	5 4
S	24	3 35	3 53	8 8	8 26	4 59	5 18	3 54	4 13	7 8	7 25	0 37	0 58	8 29	8 47	0 40	0 58	1 28	1 46	6 40	6 58	0 28	0 47	9 30	9 48	5 22	5 40
S	25	4 12	4 30	8 44	9 4	5 39	6 0	4 33	4 54	7 43	8 1	1 19	1 40	9 5	9 24	1 16	1 35	2 6	2 26	7 18	7 38	1 8	1 29	10 8	10 29	5 59	6 19
M	26	4 49	5 8	9 25	9 46	6 21	6 43	5 16	5 39	8 19	8 38	2 1	2 23	9 43	10 2	1 55	2 16	2 46	3 6	7 58	8 19	1 50	2 12	10 52	11 19	6 40	7 4
Tu	27	5 29	5 54	10 10	10 36	7 7	7 35	6 4	6 31	9 1	9 25	2 46	3 10	10 21	10 42	2 38	3 2	3 28	3 52	8 42	9 7	2 37	3 3	11 51	—	7 29	7 55
W	28	6 20	6 47	11 6	11 39	8 5	8 36	6 59	7 31	9 53	10 22	3 34	4 0	11 7	11 33	3 28	3 57	4 17	4 44	9 32	9 58	3 30	4 1	0 25	1 3	8 22	8 51
Th	29	7 15	7 44	—	0 12	9 9	9 44	8 3	8 36	10 52	11 25	4 26	4 53	—	0 2	4 27	5 0	5 12	5 42	10 26	10 59	4 32	5 6	1 42	2 21	9 22	9 55
F	30	8 16	8 49	0 45	1 17	10 19	10 53	9 9	9 42	—	0 2	5 21	5 49	0 33	1 5	5 36	6 14	6 14	6 46	11 31	—	5 39	6 10	2 56	3 29	10 29	11 3
S	31	9 25	9 57	1 49	2 18	11 23	11 51	10 15	10 45	0 40	1 17	6 18	6 50	1 38	2 11	6 47	7 19	7 18	7 50	0 3	0 35	6 38	7 6	3 55	4 19	11 37	—

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

WEATHER FORECAST FOR MAY, 1879.

THE CURRENTS OR TENDENCY OF THE AIR OVER THE BRITISH ISLANDS FOR THE MONTH OF MAY, 1879.

Date.	Duration.	Force from N. or S.	Force from E. or W.	General Direction from	Duration.	Force from N. or S.	Force from E. or W.	General Direction from
May								
1	8 h.a. to 3 h. fol. a.	12	7	N.N.W.	1 h.a. to 8 h.a.	6	3	S.S.W.
2	8 a. ,, 4 ,,	13	7	,,	3 a. ,, 8 a.	6	3	,,
3	9 a. ,, 4 ,,	13	6	,,	4 a. ,, 9 a.	6	3	,,
4	10 a. ,, 5 ,,	12	6	N.N.E.	4 a. ,, 10 a.	6	3	,,
5	... ...	...	...	...	5 a. ,, midnight	5	3	S.W.
6	0 m. to 6 a.	10	6	N.E.	6 a. ,, 3 fol. m.	5	3	,,
7	3 m. ,, 6 a.	8	6	,,	6 a. ,, 6 ,,	4	3	,,
8	6 m. ,, 6 a.	4	8	E.N.E.	6 a. ,, 7 ,,	2	4	W.S.W.
9	7 m. ,, 9 a.	0	10	E. by S.	9 a. ,, 8 ,,	0	5	W. by N.
10	8 m. ,, 8 a.	4	9	E.S.E.	8 a. ,, 10 ,,	2	4	W.N.W.
11	10 m. ,, 8 a.	6	9	,,	8 a. ,, fol. noon	3	4	,,
12	Noon to 7 a.	9	9	S.E.	7 a. ,, ,,	4	4	N.W.
13	,, ,, 8 a.	10	9	,,	8 a. ,, 1 fol. a.	5	4	,,
14	1 a. ,, 7 a.	11	9	S.W.	7 a. ,, 2 ,,	5	4	,,
15	2 a. ,, 8 a.	11	9	,,	8 a. ,, 2 ,,	5	4	,,
16	2 a. ,, 10 a.	10	9	,,	10 a. ,, 3 ,,	5	4	,,
17	3 a. ,, 10 a.	10	9	,,	10 a. ,, 4 ,,	5	4	,,
18	4 a. ,, 11 a.	9	10	,,	11 a. ,, 4 ,,	4	5	N.E.
19	4 a. ,, 1 fol. m.	8	10	W.S.W.	... ...	...	...	...
20	4 a. ,, 2 ,,	7	10	,,	1 m. ,, 4 a.	3	5	E.N.E.
21	5 a. ,, 5 ,,	5	11	,,	2 m. ,, 5 a.	2	5	,,
22	5 a. ,, 5 ,,	2	11	,,	5 m. ,, 5 a.	1	5	,,
23	7 a. ,, 6 ,,	0	12	W. by N.	5 m. ,, 7 a.	0	6	E. by S.
24	7 a. ,, 8 ,,	3	11	W.N.W.	6 m. ,, 7 a.	1	5	E.S.E.
25	7 a. ,, 9 ,,	5	10	,,	8 m. ,, 7 a.	2	5	,,
26	6 a. ,, 11 ,,	7	10	N.W.	9 m. ,, 6 a.	3	5	S.E.
27	6 a. ,, fol. noon	10	8	,,	11 m. ,, 6 a.	5	4	,,
28	6 a. ,, ,,	11	8	,,	Noon ,, 6 a.	5	4	S.W.
29	7 a. ,, 1 fol. a.	12	6	N.N.W.	,, ,, 7 a.	6	3	S.S.W.
30	8 a. ,, 2 ,,	12	6	,,	1 a. ,, 8 a.	6	3	,,
31	8 a. ,, 3 ,,	12	6	,,	2 a. ,, 8 a.	6	3	,,

NOTE.—Sun's gradients from the 1st to the 19th S. Westerly rising. They will then probably make a retrograde movement, becoming N. Easterly, and causing N. Westerly winds during the remainder of the month.

REMARKS.

1. The Table indicates — Probable Winds.

Strong	N. Westerly	tendency from the	1st	to the	3rd,	Light, variable.
,,	N. Easterly	,, ,,	5th	,,	8th,	S. Easterly.
,,	S. Easterly	,, ,,	9th	,,	13th,	N. Easterly.
,,	S. Westerly	,, ,,	14th	,,	19th,	S.Ely. to S.Wly.
,,	Westerly	,, ,,	20th	,,	22nd,	N. Westerly.
,,	N. Westerly	,, ,,	23rd	,,	31st,	Ditto.

2. Moon going South from the 1st to the 8th.
   „ coming North „ 9th „ 22nd.
   „ going South „ 23rd „ 31st.
3. Change from the Westerly to the Easterly Currents about the 5th.
   „ „ Easterly „ Westerly Currents „ 14th.
4. General Forecast:—

1st to the 4th, Fine.

5th „ 13th, Very stormy. Strong South-Easterly gale probable about the 6th. Strong Easterly winds general during this period, with snow or sleet. Severe thunderstorms about the 9th. Thunderstorms also probable about the 18th, 23rd, and 29th.

15th „ 22nd, Generally fine.

24th „ 31st, Changeable.

Temperature comparatively low. As the conditions are nearly the same, a recurrence of the weather experienced during April may be expected, although of a somewhat milder type.

D. D.

DEATH OF PROFESSOR HEINRICH WILHELM DOVE.—We regret to have to record the death of Professor Dove. He was best known in this country by his meteorological investigations, especially those relating to the *Law of Storms* and the *Distribution of Temperature over the Surface of the Globe;* but his numerous memoirs, written between the years 1827 and 1873, show that he was a careful observer and investigator in magnetism, electricity, optics, and other departments of physics. It was, however, as a meteorologist that he justly earned a European reputation; to him our own Meteorological Office has, from time to time, been greatly indebted, and he was the most active promoter of the storm-signal department in Germany. As Professor and Lecturer at the Universities of Königsberg and Berlin, he was equally remarkable for the range and accuracy of his science, and for the lucidity with which he expounded his subjects. Born at Liegnitz in 1803, he died, full of honours, at Berlin, in the seventy-sixth year of his age.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS.)

1093. Robert Lindsey, Kingston-upon-Hull, York. "Improvements in the means or apparatus employed for plugging marine and other boiler tubes."

1160. John Richardson Wigham, Monkstown, Dublin. "Improvements in illuminating lighthouses and other places."

1190. George Allix, Southampton. "An improved fid for the upper masts of yachts and other vessels."

1211. William Stroudley, Brighton. "A new or improved speed indicator for locomotive, marine, and other engines."

1220. James Clark, Barrow-in-Furness. "Improvements in and relating to tackle and gear for lowering, raising, and detaching ships' and other boats."

1229. Henry William Hemsworth, Southend, Essex. "Improvements in apparatus for raising ships, anchors, telegraph cables, and other submerged property, such improved apparatus being also applicable to other purposes."

1247. James Bennie Scott, Pollockshields, Renfrew. "Improvements in steering-engines."

1248. Charles B. Lee and Caldwell C. Jenkins, Pennsylvania, U.S.A. "Improvements in apparatus for regulating the speed of marine and other steam-engines." (A communication.)

1292. Robert Bruce Smith, Glasgow. "Improvements in steering engines and reversing engines, and in valves for the same and for other engines."

1330. John Isaac Thornycroft, Chiswick, Middlesex. "Improvements in propelling and steering ships or vessels and apparatus therefor."

1337. Henry Burgess Young, Greenwich. "Improvements in screw propulsion."

1338. John Eccleston, Liverpool, and 323, High Holborn, Middlesex. "Improvements in apparatus for steering ships and other vessels."

1361. Joseph Olguin, Cambridge Gardens, Middlesex. "An improved apparatus for the loading and unloading of vessels."

1367. Samuel Marsh, Calais, France. "Improvements in the method of and apparatus for ventilating coal and other mines, coal laden and other vessels, and other confined spaces." (A communication.)

1423. Agostino Rolando, City Road, Middlesex. "Improvements in apparatus for saving life at sea."

1446. Alfred Julius Boult, of the firm of Wm. P. Thompson & Co., 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool, British and International Patent Agents (communication in trust from Charles Lyman Garfield, New York, U.S.A.) "Improvements in processes and means for preventing and extinguishing fires in buildings or on board of ships." (Complete Specification.)

AMERICAN.

211705. Joseph Corduan, Brooklyn, N.Y. "Water-mattresses for ships."

211738. Marcus Hulings, Oil City, Panama. "Marine governors."

212143. Carl Hülster, New York. "Spring guards or fenders for vessels."

212484. Frederick W. Moseley. "Bottoms for sheet-metal vessels."

212506. Daniel Risher, Dravosburg, Pa. "Lock-gates."

AUSTRIAN.

2949. E. Becker and H. Krueg, Vienna. "Improvements in apparatus for loading and unloading corn ships."

2967. C. Brava, A. Kloger, and H. Eidner, Vienna. "An apparatus for raising wrecks, goods, &c., from the bottom of the sea without any connection with the surface."

3100. Kostovits and Schäfer, Buda-Pesth. "A universal maritime speed regulator."

3255. S. Verderber, Buda-Pesth. "Grooved pipes for locomotive, marine and tubular boilers, and for fire-heaters and surface-condensers."

BELGIAN.

47228. H. Satre. "A boat for transporting other boats."

47284. J. L. Lay. "A torpedo-boat."

FRANCE.

126342. Grüson. "Armour-plates."

126121. Thomas. "A hydraulic motor with transmission."

126165. Baumann. "Mechanical legs applicable as propellers for vessels, carriages, &c."

126203. Mathe. "A propeller applicable to vessels."

126329. Maxwell-Lyte. "An improvement in screw propellers."

126462. Heathorn. "Improvements in apparatus for increasing motive-power when liquids or fluids are employed for propelling and steering."

126358. Boulle, Paris. "A bathing-boat."

126422. Haskins. "An improved lifeboat and signal-buoy."

126434. Cozza, Marseilles. "An anchor."

126486. Blancho, à la Petite-Ile. "Applying sea-ooze for the manufacture of collector-tiles for oyster beds."

GERMAN.

4889. W. D. Rondi, Duisberg. "Modifications in Oldham's paddle-wheel."

4890. D. G. Haskins, Boston. "A lifeboat."

5194. F. L. W. de Romilly, Paris. "Propelling ships by suction of the water at the prow and ejecting it at the stern."

SPECIFICATIONS PUBLISHED DURING THE MONTH.

3052. Charles Busbridge, Lawton, Cheshire. "New or improved balance mechanism for maintaining equilibrium during the rolling and pitching of a vessel at sea, applicable to furniture, cabins and other like purposes." The article to be maintained in

equilibrium is supported on a ball and socket joint, and has a heavy weight suspended from it. The supporting structure attached to the floor or deck, follows the motion of the vessel, moving about the joint, whilst the heavy weight maintains its vertical position and the equilibrium of the article to which it is attached. Suitable locking apparatus may be added when required.

3374. John Isaac Thornycroft, Church Wharf, Chiswick. "Improvements in steering apparatus for vessels." A rudder or paddle in the form of a blade or fish's fin is made capable by means of a movable joint of being caused to lie close against the vessel or to protrude into the water, in which position a sculling motion, which may be reversed, is imparted to it, and throughout such movement the blade exerts a propelling effect, its focus being during the whole time at some efficient working angle to the direction of movement. The motion thus imparted to the blade renders it capable of turning the vessel when not in rapid motion. To turn her in rapid motion the blade is simply turned to a suitable angle as an ordinary rudder. The paddle or blade has motion imparted to it for active steering by a connecting rod moving it fore and aft, and a second connecting rod constantly turning it to the angle suited to the point of its travel, motion being given to the connecting rods by a crank-shaft, which may be turned by any suitable engine.

3425. Farnham Maxwell Lyte, Scientific Club, Saville Row, Middlesex. "An improvement in screw propellers." This has for its object the rendering more durable of iron and steel screw propellers, and making them less likely to foul than as at present constructed. On account of the blades of iron and steel propellers rusting and consequently becoming weakened and often breaking, they have been constructed of a much greater thickness than necessary for strength, in order that their inevitable dissolution may be retarded, and in consequence gun metal has been largely used as a substitute though a much inferior metal in point of strength. With the view to combine the advantages of lightness and strength, and to prevent fouling and oxidation, the inventor constructs screw propellers of iron or steel and

protects them by producing on their surfaces by means of an ammoniacal cyanide copper bath and subsequently an ordinary sulphate of copper bath, a deposit of copper which enables the screw to resist oxidation and fouling.

3428. John Sacheverell Gisborne, Craigs Court, Charing Cross, Middlesex. "Improvements in ship telegraphs." This relates to telegraphs for the purpose of conveying orders between officers and men and of repeating back those orders to show that they have been received. A transmitter, having a dial with divisions marked respectively with the different orders that have to be transmitted and an index movable by hand over the dial, is placed on the bridge, the receiving instrument placed in the engine-room has a dial and index corresponding with those of the transmitter, each dial having another hand for repeating the signals sent. On the axis of the index under the dial in the transmitter is fixed an arm carrying a roller which is pressed by springs against the interior surface of an insulated ring, into which ebonite (a non-conducting material) is let in at places corresponding with the spaces between the orders marked on the dial above. Upon turning the index to transmit an order, the roller, passing over the ebonite and conducting portion of the ring alternately, causes an interrupted electrical circuit, which by means of an electro-magnet, with a pawl upon its armature working a ratchet wheel at the receiver records the order upon that dial, a bell being set ringing at the same time by another electro-magnet continuing to do so till the order has been signalled back, a secondary dial, but with the mechanism reversed, being fitted to each instrument for this purpose. A modification of this signalling apparatus is also shown.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
113	England—South Coast—Spithead	Alteration of lights.
114	Ireland — East Coast — North Arklow Light	Proposed alteration of light carried out.
115	North Sea—Schelde River	Prohibited anchorage.
116	" Netherlands—Ship Canal—Noordzee Harbour	New lights.
117	" " Egmond-aan-zee	Alteration of lights.
118	" Germany — Outer Eider Light-vessel	Temporary withdrawal.
119	Mediterranean—Spain—Cartagena	Wreck removed, and depth now 6½ fathoms.
120	" France—Marseille	Light-vessel wrecked.
121	" Italy—Salerno Gulf—Cape Orso	Lighthouse destroyed; temporary light established.
122	" Patras Gulf—Cape Papas	Light re-established.
123	Adriatic—Spalato and Comisa	Lights restored.
124	Africa—West Coast—Senegal—Carabane	New light.
125	" South Coast—Off Durnford Point	Dangerous shoal.
126	" Tugela and Umhloti Rivers	Marks for position.
127	India — West Coast—Cambay Gulf — Goapnath Point	New light.
128	" Bay of Bengal—Poree	Alteration of light.
129	Eastern Archipelago — Philippines — Manila	Proposed light.
130	" Torres Strait—Shoals	Lucius and Aurora shoals not found in positions given.
131	Australia—South Coast—St. Vincent Gulf	Prohibited anchorage.
132	" Victoria — Port Phillip—Gellibrand Point	Alteration in fog-signal.
133	" Queensland—Port Curtis—Gatcombe Head	New harbour light.
134	New Zealand — Middle Island — S.W. Coast—Puysegur Point	New light.
135	Pacific Ocean — S.W. part — Indispensable Reef	Additional information.
136	West Indies — New Granada — Santa Marta—Morro Grande	Re-exhibition of light.
137	United States—North Carolina—Cape Hatteras	Beacon-light discontinued.
138	" Long Island—Fire Island	New automatic signal-buoy.
139	" Lakes — Michigan — Gibraltar	Light discontinued.
140	" Massachusetts — Pollock Rip	Alteration of light.
141	Canada—Bay of Fundy—Mascabin Point	New fog-trumpet.
142	" St. John Harbour—Negro Point	Breakwater destroyed, new temporary light.
143	Newfoundland—South Coast—Lamaline Harbour	New light.
144	" " Pass Island	New lights.
145	" St. Pierre Island—Galantry Head	Provisional fog-signal.

NAUTICAL NOTICES.

113.—ENGLAND.—*South Coast.*—*Spithead.*—*Alteration in Character of No-Man's Land and Horse Fort Lights.*—With reference to previous Notice, No-Man's Land Fort light has been changed from fixed red to *fixed white*, also showing a *red* sector of about 14 degrees in extent, covering the Ryde sand head and the Sturbridge shoal. And Horse Fort light has been changed from fixed white to *fixed red.*

114.—IRELAND.—*East Coast.*—*North Arklow Light.*—In accordance with previous Notice, the character of the light hitherto shown from the North Bank Arklow light-vessel has been changed to *one white revolving* light, showing *two flashes* in quick succession, followed by an interval of 45 *seconds* of darkness, the whole revolution occupying *one minute.* The light-vessel has only one mast, with a jigger-mast, the main-mast having one ball at the masthead.

115.—NORTH SEA.—*Schelde River.*—*Prohibited Anchorage near Telegraph Cables.*—To afford protection to two Telegraph cables (the positions of which are marked by notice-boards) laid between Welsoorde and Waarde, West Schelde river, mariners are cautioned not to anchor in the vicinity.

116.—NORTH SEA.—*Netherlands.*—*Ship Canal.*—*Leading Lights at Noordzee (Ymuiden) Harbour.*—Two lights are now shown from lighthouses recently erected on the south side of the canal entrance, and which when in line lead in mid-channel through the outer harbour. The lights are *fixed white*, elevated respectively 169 and 136 feet above high water, and visible from seaward between the bearings N.E. by N. and S.W. by S., from the distances of 19 and 18 miles. The lighthouses, constructed of iron and circular in shape, are painted in red and white bands; they are situated westward of the sea sluices, on the south shore of the canal, and bear from each other S.E. by E. $\frac{3}{8}$ E. and N.W. by W. $\frac{3}{8}$ W., distant 612 yards. Position of low lighthouse, lat. 52° 27′ 45″ N., long. 4° 34′ 30″ E. On the exhibition of these lights, the temporary leading lights (red and white) will be discontinued. *Variation, 16½° W.*

117.—NORTH SEA.—*Netherlands.—Lights at Egmond-Aan-Zee.*—These are now two *fixed red* lights.

118.—NORTH SEA.—*Temporary Withdrawal of Outer Eider Light-Vessel.*—In consequence of damage sustained, the outer Eider light-vessel has been withdrawn from her station; and as the repairs will occupy some time, the steam vessel *Triton* with pilots on board, will cruise off Eider river entrance, until the light-vessel is replaced in position.

119.—MEDITERRANEAN.—*Spain—Cartagena Harbour.*—The removal of the wreck of the Spanish armour-plated frigate *Tetuan*, sunk in Cartagena harbour, is completed; and the depth of water at the position is now more than 6½ fathoms.

120.—MEDITERRANEAN.—*France.—South Coast.—Wreck of Light-vessel at Marseille.*—The light-vessel moored at the north entrance of the new port, Marseille, was capsized in a squall, and until the vessel can be permanently restored in position, provisional measures have been taken to mark, in the best possible manner, the extremity of the great northern pier during the night.

121.—MEDITERRANEAN.—*Italy.—Gulf of Salerno.—Cape Orso.*—The lighthouse was *destroyed* during a heavy gale, and a *fixed red* light has been temporarily exhibited, visible 9 miles.

122.—MEDITERRANEAN.—*Gulf of Patras.—Re-exhibition of Cape Papas Light.*—The damage to the lighthouse having been repaired, the light (*fixed red*) is re-exhibited.

123.—ADRIATIC.—*Spalato and Comisa.*—Owing to gales the *fixed green* light on the extremity of the outer mole of port Spalato, and the *fixed red* light on the mole of Comisa had been temporarily extinguished; they are now *re-lighted.*

124.—AFRICA.—*West Coast.—Senegal.—Light at Port Carabane.*—A *fixed red* light has been established, elevated 52 feet, and visible 6 miles.

125.—AFRICA.—*South Coast.—Shoal Ground Westward of Durnford Point.*—Commodore F. W. Sullivan reports the existence of dangerous shoal ground, the south-western extreme of which lies W. ¾ S., distant 6½ miles from Durnford point. This danger (*Tenedos shoal*), composed of uneven coralline rock, extends apparently about 3 miles from the shore, and is steep-to on its

south-western edge, where the least water obtained was 12 feet. Position approximate, lat. 28° 59′ S., long. 31° 54′ E.

Note.—As there are no marks on the adjacent shore by which the position may be determined, and as the sea only breaks on the shoal in heavy weather, vessels should not approach this part of the coast nearer than 4 miles, nor bring Durnford point to bear eastward of E.N.E., and should keep outside the depth of 10 fathoms. *Variation*, 25¾° *W.* An easterly current is occasionally experienced at the distance of 3 to 4 miles from this coast.

126.—Africa.—*South Coast.—Tugela and Umhloti Rivers.*— The mouth of Tugela river may be easily recognised by the southern entrance point being thickly wooded and dark, and by a conical hill also thickly wooded, situated about 7 miles north-eastward of the entrance; and the mouth of Umhloti river may be known by a long flat rock about 10 feet high, situated close to the shore, and about one mile south-westward of the entrance.

127.—India.— *West Coast.—Gulf of Cambay.—Light at Goapnath Point.*—A lighthouse recently erected on the point, north side of entrance to gulf of Cambay, shows a *fixed white* light, elevated 68 feet above high water, and visible in clear weather between the bearings N.N.E. (through west) and S.S.W., from a distance of 6 miles. The lighthouse, 32 feet high, constructed of limestone, is buff coloured, and situated on a mound 240 yards within Goapnath point. Position, lat. 21° 11′ 35″ N., long. 72° 6′ E. *Variation*, 1° *E.*

128.—India.—*Bay of Bengal.—Alterations in Pooree Port Light.*—The following alterations have been made: it is a *fixed white* light, elevated 44 feet above high water, and visible 10 miles. The lantern is placed on a stone pedestal built into the parapet wall of the Circuit house at Pooree, and situated N.E. ¼ E., 270 yards from the flagstaff; the top of the lantern is 33 feet above the ground. The Circuit house and pedestal are painted white. Position, lat. 19° 48′ N., long. 85° 49′ 10″ E.

Note.—The light formerly shown from the eastern yard arm of the flagstaff is discontinued.

129.—Eastern Archipelago.—*Philippines.—Proposed Light-*

house on San Nicolas Bank, Manila Bay.—This bank, hitherto supposed to be marked by a bell-buoy, is about to have a lighthouse erected on it.

130.—Eastern Archipelago.—*Torres Strait.—Western Entrance.—Information Relating to Lucius Reef and Aurora Shoal.—Variation,* 4½° *Easterly in* 1879.

(1.) *Lucius Reef.*—The supposed position of this reef (reported as lying W. by S. ¾ S. from Booby island, distant 37 miles) was carefully examined by H.M.S. *Sappho* between June 26th and July 2nd, 1878. No indication of shoal water was discovered, and regular soundings of about 12 fathoms were found in the vicinity of this supposed danger.

(2.) *Aurora Shoal.*—This shoal was formerly said to exist at a distance of 50 miles W. ¼ N. from Booby island; H.M.S. *Sappho* sounded over and around this locality without finding any indication of the shoal. A depth of 16 fathoms was found at the western part of its assigned position, and more than 10 fathoms at the eastern and southern extremes. Soundings varying from 13 to 19 fathoms were obtained at a distance of 2 miles in all directions round the reported Aurora shoal, and between it and the supposed position of Lucius reef a depth of 12 to 14 fathoms was found.

Lucius reef and Aurora shoal are therefore not considered to be situated in the positions assigned them; and their existence is so uncertain that they have been expunged from the Admiralty charts. While sounding in the vicinity of these reported dangers the tidal streams were observed by H.M.S. *Sappho* to be strong and irregular.

131.—Australia.—*South Coast.—Gulf of St. Vincent.—Prohibited Anchorage near Telegraph Cable.*—To afford protection to the telegraph cable laid between Kingscote harbour, Kangaroo island, and Yankalilla bay, on the mainland, mariners are cautioned not to anchor in the vicinity. Should a vessel be observed at anchor near the cable, a square blue flag will be shown from the telegraph station at Kingscote, or from the flagstaff at Yankalilla, signifying that her position must be immediately shifted.

132.—Australia.—*Victoria.—Port Phillip.—Gellibrand Point.*

—*Fog-Signal.*—The following alteration was made in the fog-signal at Gellibrand point light-vessel, Hobson Bay:—During thick or foggy weather a horn will be sounded alternately with the gong *every ten minutes.*

133.—Australia.—*Queensland.—Port Curtis.—Harbour Light on Gatcombe Head.*—Exhibited from the west side of the pilot's dwelling on Gatcombe head, north side of entrance to port Curtis. It is a *fixed white* light, elevated 80 feet above high water. Position, lat. 23° 53′ 5″ S., long. 151° 23′ 30″ E.

Note.—This light is obscured when bearing eastward of E. by S. ¾ S. Vessels proceeding up the harbour should, on opening out the light, steer towards Auckland point; as, with the light in sight, West banks and the shoal ground extending off South Trees point will be avoided. *Variation,* 8½° *E.*

134.—New Zealand.—*Middle Island.—South-West Coast.—Light on Puysegur Point.*—From a lighthouse on Puysegur point, near Preservation inlet, western approach to Foveaux strait; it is a *flashing* light, showing a flash every *ten seconds,* elevated 180 feet above the sea, and visible about 19 miles. The lighthouse, 40 feet high, is constructed of wood and painted white. Position, lat. 46° 10′ S., long. 166° 38′ E.

135.—Pacific Ocean.—*South-West Part.—Indispensable Reefs,* discovered by Captain Wilkinson in the ship *Indispensable* in 1790, have recently been examined by Lieutenant Richards, R.N., in the *Renard.* These dangers have been found to consist of three separate reefs, named respectively North, Middle, and South reefs, and to extend in a N.W. and S.E. direction a total distance of 57 miles. No anchorage of any sort could be observed, the reefs being steep-to all round.

North Reef, enclosing a deep water lagoon, is 12 miles long in an E.S.E. and W.N.W. direction, and its greatest breadth is 4 miles. The north-west point of the reef, marked by two conspicuous rocks, is in lat. 12° 15′ S., long. 159° 59¾′ E. There are two openings in the reef, one on the west side, situated 1 mile southward of the two rocks, and the other on the north side, 5 miles from the east point. Both openings are apparently narrow, and consequently difficult of entrance, especially the northern one,

as the current runs strongly to the westward along the north side of the reef.

Middle Reef, separated from North reef by a passage 1½ to 2 miles wide, extends in a south-easterly direction for 22 miles to a point, off which is a heavy tide rip which might easily be mistaken for a continuation of the breakers. Thence the reef curves gradually to the westward and to the southward, thus forming a deep bight. From the south end in lat. 12° 49′ S., long. 160° 25′ E., the reef trends gradually to the westward and northward for 15 miles, where it terminates. No soundings with 150 fathoms of line could be obtained between the extremities of this reef; the interior also appeared very deep.

South Reef is separated from Middle reef by a passage 1½ miles wide, in which no bottom with 25 fathoms of line could be obtained. This reef encloses a deep water lagoon, and is 15 miles long and 8 miles broad, of an oblong form, and having a horseshoe curve in the south side. Its south point is in lat. 13° 2¾′ S., long. 160° 36½′ E.

Neptune Reef, on which the ship *Neptune* was wrecked in 1868, was described as 16 to 18 miles long by about 7 miles wide, and forming a deep lagoon. The vessel was said to have struck near the middle of the eastern edge of the reef, in lat. 12° 54′ S., long. 161° 45′ E. The locality of this reported danger has been carefully examined by Lieutenant Richards during a search extending over a period of five days, but no indications of shoal water could be observed. No bottom with 150 fathoms of line was obtained in the position given by the master of the *Neptune*. It is also understood that several masters of vessels have been close to the assigned position without seeing the reef. It is therefore probable that the *Neptune* struck on a part of the Indispensable reefs; and *Neptune reef* has accordingly been *expunged from the chart.*

Wells Reef, discovered by H.M.S. *Pandora* in 1791, was placed in lat. 12° 20′ S., long. 157° 58′ E.; a search extending over a period of eight days has now been made for this reef by the *Renard*, in the reported locality, but without success; no bottom being on any occasion obtained with 150 fathoms of line. The position must therefore be regarded as doubtful.

Current.— The current here sets to the westward, and on striking Indispensable reef appears to divide into two branches; one setting to the north-west along the reef, and the other to the south-west. Between Rennell island and Indispensable reefs the current sets strongly to the westward: a set of 49 miles in 24 hours was observed on one occasion. To the northward of the assigned position of Neptune reef the surface drift was north. In the vicinity of the assigned position to Wells reef the current sets strongly to the west and north-west. The current is probably much influenced by the wind. *Variation*, 8½° *E.*

136.— West Indies.— *New Granada.— Santa Marta.— Re-Exhibition of Morro Grande Light.*—The illuminating apparatus having been renewed, the light (fixed white) is re-exhibited.

137. — United States. — *North Carolina. — Cape Hatteras Beacon Light Discontinued.*— Changes in the shoals off Cape Hatteras, having rendered a light on the extremity of the cape unnecessary, the small light, known as Cape Hatteras beacon, will be discontinued on and after June 30, 1879.

138.—United States.—*Long Island.—Automatic Signal-Buoy off Fire Island.*—Placed about 7 miles southward of Fire island, approach to New York from the eastward. The buoy is moored in 13 fathoms, with the following bearings, viz.:—Fire island lighthouse, north; Sandy Hook light-vessel, west. Position approximate, lat. 40° 30½′ N., long. 73° 12′ W. *Variation*, 8° *W.*

139.—United States.—*Northern and North-Western Lakes, Michigan.—Gibraltar Light (Detroit River) Discontinued.*—This light has become unnecessary since the establishment, by the Government of the Dominion of Canada, of a light-ship off Bar point, entrance to Detroit river, and will not be re-lighted on the opening of navigation in the spring of 1879.

140.—United States.—*Massachusetts.—Alteration of Pollock Rip Light.*—On and after July 1st, 1879, Pollock Rip light-ship, off Chatham, eastern end of Vineyard sound, will show *two fixed red* lights, instead of one white light, as at present.

141.—Canada.—*Bay of Fundy.—Fog-Signal on Mascabin Point.*—At the southern entrance of Letite passage, Passamaquoddy bay. The signal is a Trumpet, which during thick weather, fogs

and snow storms, will sound blasts of *seven seconds'* duration at intervals of *thirty seconds*. The building is square with shed attached, and is painted white. Position, lat. 45° 2′ 20″ N., long. 66° 53′ 30″ W.

Note.—This signal will probably be heard from 2 to 3 miles against the wind, from 6 to 7 miles with the wind.

142.—CANADA.—*Bay of Fundy.—St. John Harbour.—Negro Point.—Destruction of Breakwater and Exhibition of Temporary Light.*—The breakwater was destroyed in a storm, and in consequence, the lighthouse has been taken down; on the removal of the lighthouse, a *fixed red* light was to be exhibited from a beacon pole at the extremity of the breakwater works.

Note.—Dependence should not at all times be placed on this light; the approach to St. John harbour is now said to be dangerous in stormy weather.

143. — NEWFOUNDLAND. — *South Coast. — Light at Lamaline Harbour.*—A *fixed white* light is established on the S.E. coast of Allan island, entrance to Lamaline harbour. Further particulars will be given.

144.—NEWFOUNDLAND.—*South Coast.—Light on Pass Island.*—Two lights have been established on Pass island, entrance to Hermitage bay; a *fixed white* light, elevated 280 feet, visible all round the horizon to a distance of 19 miles, and, 14 feet below it, a *fixed red* light to mark the position of the rocks extending between Wolf rock and Basse Terre point. Further particulars will be given.

145.—NEWFOUNLDAND.—*St. Pierre Island.—Provisional Fog-Signal at Galantry Head.*—The fog-whistle at Galantry head being out of repair, a gun will be fired at the lighthouse once *every hour* during thick weather, fogs, or snow-storms, from 14th March to 1st December; but between 1st December and 14th March, only at the time of the expected arrival of the mail steam vessel from Halifax.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, 1879.

No. 4.—PACIFIC OCEAN, South-east Part, Notice 45; information respecting Caroline, Flint, Otaheite and Suwarrow Islands.

No. 5.—Pacific Ocean, South-west Part, Notice 46; information respecting Indispensable, Neptune, and Wells reefs; also respecting Rennell, Bellona, and Mitre islands.

No. 6.—China Sea Directory, Vol. I., Notice 1; relating to Sumatra, Malacca strait, Singapore harbour, Sunda strait, Gaspar strait, and Varella strait.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1879.

(*This List is completed to the* 18*th of each Month.*)

366. *Elphinstone*, s.s.; built at Jarrow, 1874; owned by Mr. J. McIntyre; tonnage, 1,145; Galveston to Liverpool; cotton; explosion of the boiler at sea, November 24, 1878, whereby two lives were lost. Inquiry held at Liverpool, March 7, 1879, before Raffles, Stip. Mag.; Harris and Ravenhill, N.A. Casualty caused by the bursting of a tube in the port boiler which had been plugged with an inefficient stopper. No blame attached to master or officers.

408. *Mary Stenhouse*, ship; iron; built at Belfast, 1854; owned by Mr. E. P. Bates, of Liverpool; tonnage, 1,243; Barrow to Newport; ballast; stranded in Rhossili Bay, February 11, 1879. Inquiry held at Liverpool, March 14, 1879, before Raffles, Stip. Mag.; Holt and Wilson, N.A. Stranding caused by the master of the tug *Resolute* taking a course too near the land, and not making allowance for the indraught and heavy swell setting into Carmarthen Bay. Master of tug ordered to pay £10 towards costs.

104. *Mary*, s.s.; iron; built at Hebburn, 1868; owned by E. J. Hough & Co.; tonnage, 556; Carthagena to the Tyne; iron ore; lost at the entrance of the Tyne, February 16, 1879. Inquiry held at North Shields, March 15, 1879, before Rothery, Wreck Commissioner; Grant and Beasley, N.A. Casualty due to the master being misled by the leading lights at the entrance of the Tyne, and in not keeping the High Light sufficiently open to the southwards of the Low Light. Master guilty of an error of judgment only.

411. *Augusta*, s.s., and *Flying Hurricane* (steam tug); the *Augusta* was built at Middlesborough, 1857; owned by Messrs. Anderson, Hannay & Co.; tonnage, 188; Sligo to Glasgow in tow; ballast; both vessels lost on Tory Island, Co. Donegal, February 14, 1879. Inquiry held at North Shields, March 18, 1879, before Rothery, Wreck Commissioner; Grant and Beasley, N.A. Master of the *Augusta* to blame for trusting entirely to the commander of the tug, the latter also blameworthy for volunteering to navigate the vessels through a difficult and dangerous channel with which he was not thoroughly acquainted. Neither of the masters held certificates.

412. *Aberfoyle*, s.s., and *Kewadin;* the former, iron; built at Sunderland, 1877; owned by Messrs. Adam; tonnage, 738; Almeria to Leith; lead, &c. The latter built at Charlottetown, Prince Edward's Island, 1866; owned by Mr. J. Bloom, of Folkestone; tonnage, 226; Shields to Torquay; coals; in collision off Scarborough through which the *Kewadin* foundered and loss of life ensued. Inquiry held at North Shields, March 12, 1879, before Rothery, Wreck Commissioner; Grant and Beasley, N.A. Collision due to the officer in charge of the *Aberfoyle* not seeing the *Kewadin* until close upon her, which may have been occasioned by the ship's lights being hidden by the foresail. The certificates of the master of the *Kewadin* and mate of the *Aberfoyle* were returned.

413. *Wycliffe*, s.s.; iron; built at Wallsend, in 1874; owned by Mr. J. Bell, of Newcastle; tonnage, 878; Philadelphia to St. Nazaire; wheat; lost on a reef to the westward of Noirmoutier Island, coast of France, February 17, 1879. Inquiry held at North Shields, March 20, 1879, before Rothery, Wreck Commissioner; Grant and Beasley, N.A. Master to blame for steering improper courses, not endeavouring to obtain a pilot, not verifying his position, and not remaining on deck. Certificate suspended for eighteen months.

414. *John and Emma* and *Hewett*, s.s.; the former built at Plymouth in 1866; owned by Mr. S. Simmons, of Lowestoft; tonnage, 53; on a fishing cruise. The latter, iron; built at Stockton in 1877; owned by Hewett & Co.; also on a fishing

cruise; in collision near Lowestoft, March 4, 1879, whereby one life was lost. Inquiry held at Westminster, March 21, 1879, before Rothery, Wreck Commissioner; Holt and Castle, N.A. Both masters to blame, but were uncertificated.

416. *Barbadian*, ship; built at Dumbarton in 1867; owned by Messrs. R. and D. Kerr, of Greenock; Greenock to Demerara; coals; stranded on the Coast of Ireland, February 20, 1879. Inquiry held at Greenock, March 20, 1879, before Neill and Ross, J.P., Powell and Wilson, N.A. Master guilty of an error of judgment but not neglect of duty. Certificate returned.

Official Inquiries Abroad.

Peshawar, s.s., and *Jellinghee*, flat; in collision in the River Hooghly, June 25, 1878. Inquiry held at Calcutta. Accident attributable to the master of the steamer *Madras*, which was towing the *Jellinghee*, endeavouring to cross the *Peshawar's* bows.

Aline, barque; lost on the Island of Yori-Shima, November 2, 1878. Naval Court held at Hiogo, December 31, 1878. Master censured for unnecessarily standing close inshore.

Agenoria, s.s., and *Aimee*, s.s.; in collision in Sydney Harbour, December 18, 1878. Inquiry held at Sydney, December 31, 1878. Master of the *Aimee* to blame for not keeping the starboard side of the fairway. The Court censured him.

Dove, ship; abandoned at sea, November 10, 1878. Naval Court held at Kanagawa, Japan, January 10, 1879. Vessel leaky. Master justified in abandoning her.

Eagle, s.s., and *Ajax*, s.s.; in collision in Newcastle Harbour, N.S.W., December 24, 1878. Inquiry held at Newcastle, January 10, 1879. Master of *Ajax* not to blame. Not proved that proper light was shown on board the *Eagle*.

Katoomba, s.s.; stranded on the Venus Bank, January 1, 1879. Inquiry held at Brisbane, January 14, 1879. Casualty due to defective steering on the part of a seaman. Master exonerated from blame.

Macedon, s.s.; stranded on the Venus Bank, January 8, 1879. Inquiry held at Brisbane, January 24, 1879. Casualty due to stress of weather. Master entirely exonerated from blame.

Royal Shepherd; accident to boiler, January 8, 1879. Inquiry held, January 8, 1879. Casualty caused by the default of the second engineer. Court severely censured him.

Onward, barque; lost at sea. Inquiry held at Sydney, January 16, 1879. Master in default. Certificate cancelled.

Rosario, barque; burnt at Tongoi, January 28, 1879. Inquiry held at Coquimbo, February 3, 1879. Master exonerated from blame.

Lunan, brig; lost near the entrance of the Harbour of Shanghai. Inquiry held at Amoy, January 27, 1879. Master to blame for making the port when he did, and for not anchoring. Certificate suspended for six months.

Star Queen, barque; lost on Oshima, Goto Islands, January 22, 1879. Naval Court held at Nagasaki, February 4, 1879. No evidence to warrant attributing blame to anyone.

Maggie, barque; stranded on Toney Rock Bar, February 20, 1879. Naval Court held at Nassau, March 1, 1879. Casualty due to chains of mooring buoy parting. Master exonerated from blame.

Janet Forbes, barque; lost on Cayo Verde, February 27, 1879. Naval Court held at Havana, March 3, 1879. No blame attached to master or officers.

GENERAL.

ROCKET APPARATUS SERVICE.

SANDLEMERE, 15th February, 1879.—The *Snapper,* of Hull, came ashore about half-a-mile from this station, the weather being hazy and thick with snow storms. The coastguard hastened with the rocket apparatus to the assistance of the crew, and succeeded after some delay, caused by their ignorance of the use of the apparatus, in rescuing four of the crew who remained on board. The crew consisted of six persons, but the other two had left in the ship's boat, which capsized, but the men were fortunately rescued by the rocket party.

QUARANTINE REGULATIONS FOR VESSELS IN CHILIAN WATERS.

The following regulations appeared in the "*Diario oficial de la Republica de Chile*," October, 1878:—

ARTICLE 1. *Epidemics.*—Vessels coming from ports which have been designated by the President of the Republic as infected, that is, those in which the pest, the yellow fever, and the cholera exist, are subject to permanent quarantine regulations. Vessels coming from ports in which severe and contagious diseases exist, such as typhus, small-pox, dysentery, &c., are subject to conditional quarantine regulations.

ART. 2. Vessels coming into or leaving Chilian waters may be simply visited, or, if the necessity exists, may be inspected by the proper authorities.

ART. 3. *Bills of Health.*—Bills of health are divided into two classes—clean and unclean. All foreign bills of health are to be considered as unclean. In Chile, bills of health are considered good only when issued within 48 hours before the vessel's departure. Bills of health from abroad, issued to vessels about departing for Chilian waters, must be obtained from the Chilian consul, if allowable by the local authorities; but all bills of health must be signed by the Chilian consul. But one bill of health, however, is necessary for each vessel.

ART. 4. Before leaving Chilian waters each vessel must have a bill of health, and during the existence of epidemics all vessels must be inspected before such bill of health is given. The proper authorities may detain a vessel having contagious diseases or unclean matter on board until such vessel has been cleaned and fumigated.

ART. 5. Vessels with over 150 souls on board must carry a surgeon, who is responsible for the care of the sick and sanitary precautions to be observed. Infected and unclean material is to be destroyed and bodies are to be sunk.

ART. 6. The same precautions are to be observed after the vessel's arrival as during and before the voyage.

ART. 7. Under both the strict and conditional quarantines passengers may be taken to the Lazaretto. No vessel is allowed to

leave the roadstead at the quarantine, and the landing of passengers and cargo may also be forbidden.

ART. 8. There are Lazarettos afloat and ashore, and they fly a yellow flag with the letter Q, the same as vessels in quarantine.

ART. 9. Only in extraordinary cases will vessels be excused from visit and inspection.

THE FIJI ISLANDS.—According to the estimates of revenue and expenditure for the current year, there is reason to hope that by the end of 1879 this new British Possession will have proved itself to be self-supporting. The estimated total expenditure for 1879, viz., £74,052, shows, however, an advance over the preceding year of nearly £9,000, but this excess is principally owing to a large item entered in the estimates as the cost of Polynesian immigration. The total revenue for the year had been moderately estimated at £75,150. The native taxes were expected to bring in some £19,800, and the Customs to produce £20,900, both these items having shown marked progress during the preceding two years. The system of native taxation, receivable in produce, which had been so severely criticised in many quarters, had proved to be a remarkable financial success, for the cost of collection was small, and it was the most satisfactory mode of taxing the natives. The islands of Fiji possess advantages which place settlers in a position, in all respects but that of labour, equal or superior to that of the most prosperous West Indian planters, for the climate, owing to the entire absence of malarious fever, is unusually healthy, and the conditions of weather and soil are peculiarly favourable to the cultivation of several kinds of tropical produce. The products of cocoanut plantations appear to be steadily rising in value, the prospects of coffee growing are very favourable, sugar cultivation has been exceedingly remunerative owing to the proximity of the Australian markets, and there appears to be no reason why cotton should not again become an important staple of the colony. There is every reason to hope that at no distant date Fiji will be one of the most thriving of England's tropical possessions.

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THE ALLEGED DISCOVERY OF THE REMAINS OF COLUMBUS.

A CONTROVERSY of considerable interest to the maritime world has recently sprung up respecting the true place of sepulture of Christopher Columbus, the discoverer of the New World. It has been for nearly a century the general belief that his mortal remains were transported from Santo Domingo to the Havana in 1795, upon the cession of the Spanish portion of Hispaniola to the French Republic; but a pastoral letter has been recently issued by the Right Reverend the Bishop of Orope, the Vicar Apostolic of the Archdiocese of Santo Domingo, announcing the discovery of the true remains of the great navigator in the chancel of the cathedral church of Santo Domingo. This letter has been followed up by a notification, addressed by the Bishop to the various Governments of the civilized world, requesting them to contribute "to the erection of a monument worthy of the Father of the New World." The attention of men of letters has naturally been directed to examine the evidence of an alleged discovery which displaces the literature of an entire century, and the public Press of the New World, which has taken a warmer interest in the subject than the

European Press, has suspended its judgment until the Report of the Royal Academy of History of Madrid, to which body the Government of Spain has referred the examination of the evidence of the alleged discovery, should have been made public. That Report has been recently published by the Spanish Government, and the subject may now be considered to be presented to the civilized world in a form, which will justify it in pronouncing its verdict.

To go back to a period shortly following the death of Columbus, which event took place on 20th of May, 1506, we find it recorded in the official register of the Carthusian Convent of Santa Maria de las Cuevas, at Seville, under the year A.D. 1536, that the mortal remains of Don Cristoval Colon (Columbus) and of Don Diego, his son, were delivered up in that year for the purpose of being transported to the island of Santo Domingo in the Indies. It had been the long-cherished wish of the discoverer of the New World, as expressed in his last will and testament, that his mortal remains should be transported, as soon as his son, Don Diego, should find the means, to the island of San Domingo, there to be interred for ever in the city of La Concepcion. It was not, however, granted to Don Diego to fulfil his father's wishes. It is well known how the hero "who gave to Castille and Leon a new world" was allowed to die in abject poverty at Valladolid, and that he was indebted to the affectionate compassion of the guardian and brethren of the Franciscan convent in that city for a temporary resting-place, where his mortal remains might await their removal to the permanent resting-place of his own choice. His son, Don Diego, had already commenced his preparations to fulfil his father's wishes, in 1513, by transferring his mortal remains to a vault in the Carthusian convent above mentioned, at Seville. Meanwhile, the dark clouds, which had overshadowed the death-bed of "the great navigator," were dispersing, and his son, Don Diego, had acquired, by his marriage with Donna Maria de Toledo, the niece of the famous Duke of Alva, a position of favour and influence with the Court, which had secured to him the succession to the Admiralty of the Indies, and on the death of his uncle, Don Bartholomew, the important post of Governor (Adelan-

tado). He was, however, carried off prematurely by a fever in 1526, and it was left to his widow to fulfil her husband's pious task, as the guardian of her eldest son Don Luis, who had meanwhile succeeded to his father's title of Admiral of the Indies. All rivalry had ceased at this time between the Crowns of Castille and of Arragon, which were united in the person of the Emperor Charles V., and the wearer of the crown of Arragon could no longer feel any rancour against the memory of the man, who had added the jewel of the Indies to the Crown of Castille. We find accordingly that on the petition of Donna Maria de Toledo, who is styled Vice-Queen of the Indies, the Emperor Charles V. granted to her son, Don Luis, the great chapel or chancel of the cathedral church of Santo Domingo, to be henceforth a place of interment for the mortal remains of the Admiral, his grandfather, "Don Christóbal Colon," and for all other members of his family. This Royal grant was dated from Valladolid, 2nd June, 1537, but it does not appear to have been immediately acted upon, as the chancel was found to be too small for the intended purpose, and the Dean and Chapter resisted the Royal grant. The result was, that the chancel was taken down and rebuilt on a larger scale, corresponding with the architecture of the church, and a further Royal grant was issued on 22nd August, 1539. Further objections, however, appear to have been raised by the Dean and Chapter to the position of the vault, in which it was proposed to inter the remains of the Great Admiral, and these objections led to the issuing of a third Royal grant, dated from Madrid, 5th November, 1540, specifying the precise part of the chancel, in which the vault should be made. These Royal grants are on record in the Archivo Genéral de Indias, at Seville, and have been printed in the Appendix to the Report, to which we have referred as having been drawn up by the Royal Academy of History at Madrid. It is deserving of note, that in the last of the three Royal grants it is recited that a plan of the chancel, showing the precise spot, where it was intended to inter the remains of the Admiral D. Cristoval Colon, was submitted to the Royal Council of the Indies and was approved by them. There is no official record preserved, as far as we are aware, of the reception of

the body of the Great Admiral in the chancel of the cathedral church of Santo Domingo, but mention is made of the fact that his grandson, Don Luis, was present at its reception, in a manuscript narrative of affairs in Espaniola, drawn up by D. Alonso de Fuenmayor, the first archbishop of the diocese. The narrative is in the possession of Sr. Lopez Prieto, a resident in the Havana. It is entitled, *Relacion de cosas de la Española*, and under the year 1549, the Archbishop writes that "the remains of the Great Admiral D. Cristoval Colon were received by his grandson, Don Luis, at that time in Santo Domingo, with all due respect, and that the sepulchre of the Great Admiral, where his bones rest, is much venerated and reverenced in that church."* The authority of this manuscript has been thought sufficiently great to entitle it to notice in the preliminary Report drawn up by the learned D. Antonio Lopez Prieto on the subject of the "Remains of Columbus," which was presented by him to the Governor-General of Cuba, in March, 1878. Further, there is the testimony of Fra Bartolemé de las Casas in the dedication prefixed to his "Historia de las Indias," which bears date November, 1559, that the remains of the Great Admiral lay at that time interred in the great chapel of the cathedral church of Santo Domingo. Unfortunately the archives of the cathedral church have been frequently plundered and the early records have been destroyed, and much is consequently left in obscurity, which those records would have otherwise made clear. We select from the documents, which the next following century supplies, two important notices, which are precise in their description of the burial place of the Great Admiral. The first was issued on the occasion of an English fleet arriving off the port of Santo Domingo in 1655, when the Archbishop Don Francisco Pio, fearing that the heretics would profane the tombs of the cathedral,† directed them all to be

* "La Sepultura del Gran Almirante D. Cristóval Colon, donde están sus huesos, era muy venerada é respetada en aquella Santa Iglesia."

† The memory of the ravages committed by the English, under the command of Sir Francis Drake, in 1586, when they sacked the city of San Domingo, had not at this time died away.

covered over with earth "more particularly that of the old Admiral, which stands on the gospel side of the altar in the chapel of the cathedral." The second notice occurs in 1676, when the Archbishop Don Juan de Escalante made a representation to the Royal Council of the Indies concerning the poverty of the cathedral, which had been almost destroyed by an earthquake in 1673, and alleged amongst other grounds why the Council should contribute to its restoration, that on the right hand of the altar in the great chapel lies interred the body of the illustrious Don Cristoval Colon.

We will now pass over a century, and halt at 1783, which is an important epoch in the enquiry. It was found necessary in that year to execute certain repairs in the chancel of the cathedral church of Santo Domingo, and to rebuild a portion of the wall on the gospel-side of the great altar. In the course of the operations the workmen came upon a chest of stone containing a leaden case, both being of a cubical form and about a yard in height. The leaden case was a good deal damaged and was found to contain human bones. A few years before, under somewhat similar circumstances, the workmen had discovered on the epistle side of the altar a similar chest with human bones in it. Such is the substance of a certificate drawn up on 20th April, 1783, by Don José Nuñez de Cáceres, the dean of the cathedral church, and forwarded by him to Don Isidoro Peralta, the governor of the island of Hispaniola. The certificate goes on to state, that according to a tradition preserved amongst the oldest inhabitants of Santo Domingo, and recorded in a synod of the cathedral, the case on the gospel-side of the altar was believed to contain the bones of the Admiral Cristoval Colon, and the case on the epistle-side of the altar to contain the remains either of his brother D. Bartolemé, or of his son Don Diego Colon.

A second certificate drawn up by Don Pedro Galvez, the head master of the cathedral school, on the 26th April of the same year, states that the workmen on this occasion met with a chest of stone containing an urn of lead much damaged, which contained human bones, and that they remembered having met with a similar chest on the epistle-side of the altar, and that according to the tradition of the oldest inhabitants, and of a chapter of the synod of the cathedral church, the chest on the gospel-side con-

tained the bones of the Admiral, and that on the epistle-side those of his brother Bartholemew. These certificates were placed in the hands of M. Moreau de Saint Mery, who visited the island of Santo Domingo in 1780, and who remained there some years, making extensive researches in the Spanish parts of the island. Having found no external vestiges of the sepulchre of the Great Admiral in the chancel of the cathedral, he addressed a letter to D. José Solano, the Lieutenant-General of the Spanish Fleet, who had been formerly Governor of Espaniola, and who communicated his letter to Don Isidoro Peralta, above-mentioned, the actual Governor. M. Moreau de Saint Mery has published in his description of Santo Domingo,* the reply of the Governor, the substance of which was, that in demolishing a portion of a thick wall with a view to reconstruct it, the workmen discovered a leaden case inclosed in a stone chest interred in the sanctuary, on the gospel-side of the altar, with no inscription on it, but they knew from a constant and unvarying tradition that it contained the remains of Columbus. Certain canons of the cathedral had seen on this occasion the bones, which were reduced for the most part to dust, but amongst them they had recognised some bones of a fore-arm (algunos del antebrazo). Further, that the remains of his brother, Don Bartholomew, had been discovered some years before on the epistle-side of the altar, under similar circumstances. Such was the condition of the mortal remains of the Great Admiral in 1783, according to trustworthy evidence of the highest authority forthcoming during the time, when Santo Domingo remained in the possession of the Spaniards. Barely twenty years had elapsed after this verification of their condition, when in accordance with the Treaty of Basle, of 22nd July, 1795, more generally known as the Treaty of San Ildefonso, at which place it was ratified by the King of Spain, the Spaniards had to cede to the French Republic that portion of the island, which had been retained by them after the dismemberment of Espaniola consequent on the peace of

* "Description Topographique et Politique de la Partie Espagnole de l'Isle Saint Domingue," Tom. I., p. 125. Philadelphie. 1796.

Ryswick of 1697. It was resolved on this occasion that Spain should not abandon to strangers the ashes of the discoverer of the New World, and the Duke of Veragua, the lineal descendant* of the Great Admiral, sent his commissioners to take part in the solemn ceremony of disinterring the mortal remains of his ancestor, and of removing them from the resting-place designated by his last wishes. Whether this removal was or was not a pious act on the part of the kinsman of the Great Admiral may be left to the casuist to determine. It commended itself to the religious feeling of the descendants of Columbus by the circumstance that Cuba, to which it was proposed to transfer his remains, was the island where Columbus had first planted the Standard of the Cross, whilst Spain has the credit of making it a point of honour, that the remains of the First Admiral of the Indies should continue to repose under the protection of the flag, which in his lifetime he had made the leading flag of Europe in maritime matters, for notwithstanding the earlier discovery of the Eastern Indies by the Portuguese, Spain had placed herself, through the enterprise of Christopher Columbus, at the head of the maritime powers of the world.

The resolution to remove the remains of the Great Admiral originated with Don Gabriel de Aristizabal, the Lieutenant-General of the Naval Forces of Spain in the Indian Seas. It was a subject of careful consultation on his part with the Governor of Santo Domingo, the Archbishop of the Province, and the Dean and Chapter of the Cathedral, and the exhumation took place in the presence of the highest local authorities, and of two Commissioners on the part of the Duke of Veragua, namely, Don Juan Bautista Oyarzabal and Don Andrés de Lécanda.† Every precaution was

* The present Duke of Veragua inherits his title from Don Luis, the grandson of the Great Admiral, through Isabella, his sister, who married Don Giorge of Portugal, Count of Gelves, whose grandson, Don Nuno Gelves de Portugallo, was declared entitled to the Dukedom of Veragua by a decree of the Council of the Indies, of December 2nd, 1608.

† An account of the transportation of the remains of Columbus from Santo Domingo to the Havana will be found in Washington Irving's "Life of Columbus," Vol. IV., p. 65.

taken to authenticate the exhumation, and a Notarial Act was drawn up certifying that a tomb was opened, which stood above the chancel floor on the gospel-side of the altar, in the principal wall or pedestal of the high altar, which was about a cubic yard in size, and within it were found some plates of lead, indicating that they had formed parts of a case of that metal, and also some pieces of bone like the small bones of a human body, that these fragments were collected in a silver salver together with other mould or ashes, the colour of which identified them as having formed part of the human body. These remains were carefully deposited in a gilded chest of lead, about half-a-yard in length and breadth, and more than a fourth of a yard in height, which was secured by an iron lock, the key of which was delivered to the Archbishop. On the following day the leaden chest, having been enclosed in a more ornamented wooden case, was carried in solemn pomp, after various religious ceremonies had been solemnized in the cathedral, on board a brigantine called the *Descubridor*, whence they were transhipped on board the *San Lorenzo* and transported to the Havana. On their arrival, the key of the leaden chest was delivered to the Governor of the Island of Cuba, who, having verified its contents, caused the remains of Columbus to be deposited with great reverence, after a solemn religious service conducted by the bishop, in a niche in the wall on the gospel-side of the high altar* of the cathedral of the Havana. The Notarial Act certifying "the exhumation of the remains of Cristoval Colon on the 20th day of December, 1795," is preserved in the Archivo Général de Indias, at Seville, and is signed by Joaquin Garcia, the Governor of Hispaniola, Fr. Fernando, the Archbishop of Santo Domingo, Gabriel de Aristizabal, the Lieutenant-General of the King of Spain's fleet, Gregorio Savinon, one of the rectors of the illustrious guild of the city, and Don José Francisco Hidalgo, the notary public who drew up the Act. It is incredible that the Dean and Chapter of the Cathedral of Santo Domingo should on so solemn an occasion have misdirected the exhumation, and should

* Full particulars of this event are given by Navarrete, in his "Coleccion de los Viajes y Descirbrimientos," Tom. III., p. 365.

have allowed their Archbishop to take part in sealing up an urn. into which the ashes of another than the Great Admiral had been transferred, and to conduct on the following day a religious ceremony of the most solemn character, in which the name of the Great Admiral must have found a place. Yet such a profanation of the grave and of sacred things must have taken place, if it can be established that the true remains of Columbus have been recently discovered in their original resting-place in the Cathedral of Santo Domingo.

The news of the alleged discovery was first announced to the world in a pastoral letter from the Bishop of Orope, the Vicar Apostolic of the Arch-Diocese of Santo Domingo. From his account it appears, that it had become necessary to undertake certain repairs in the chancel of the cathedral church, and in the course of their execution the workmen met with a leaden urn or chest, on the left-hand side of the chancel, containing human remains, and having upon it the inscription, "El Almirante D. Luis Colon, Duque de Veragua, Marques de . . . . ." This preliminary event happened either in the month of June or of September, 1877. Respecting this coffin or urn, no question can well be raised. Don Diego, the son of the Great Admiral, had two sons by his wife Donna Maria de Toledo, who were respectively named Luis and Cristoval. It devolved on Don Luis, the elder, to fulfil the duty imposed by the last will of the Great Admiral upon his heirs, and the tradition is, that Don Luis fulfilled that duty in person, and was present when his grandfather's remains were interred on the gospel-side of the chancel in accordance with the Royal grant of the Emperor Charles V. We have already observed that the ancient records of the cathedral church have perished, otherwise there might have been found in them a notice of the interment of Don Luis himself. Two or three leading facts, however, are known respecting Don Luis and his brother Don Cristoval, namely, that Don Cristoval predeceased Don Luis; that he died in Santo Domingo and was interred in the chancel of the cathedral; and that Don Luis died at Oran, in Africa, in 1572, and that his remains were deposited for a short time in the Carthusian Convent of Las Cuevas in Seville, and were ultimately

transported to the family vault in Santo Domingo. He had been created Duke of Veragua and Marquis of Jamaica some time before his death, in return for surrendering up all pretentions to the hereditary Vice-Royalty of the New World, and he had consented to commute his claim to a tenth of the produce of the Indies for an annual pension of one thousand doubloons of gold. He had no legitimate son, and was succeeded in his titles by his nephew Diego, the son of his younger brother Cristoval.

Although the archives of the cathedral throw no light on the interment of the two brothers, there is a very remarkable document, to which we think the Report has not given all the weight which is due to it, namely, a notice of the burial places of the two brothers, Don Luis and Don Cristoval. This notice occurs in an account of the proceedings of a Diocesan Synod, convoked by the Archbishop of Santo Domingo in 1683.*

The proceedings of this Synod have been fortunately preserved to the present time in a printed book, published in Madrid, in 1683, which contains a notice of the burial place of Don Luis of a very singular character, and which has acquired an unexpected importance by the discovery of his coffin. We are indebted to the Report already mentioned of the Academy of Madrid, for an extract from this work, which states that "the bones of Cristoval Colon are interred in a case of lead in the chancel at the side of the pedestal of the great altar with those of his brother Don Luis, which are on the other side, according to the tradition of the oldest inhabitants of the island." Unfortunately this statement in the Report of the Synod seems to have been misunderstood in 1795, and it was suggested at that time that the mention of Don Luis, as the brother of Don Cristoval Colon, was a clerical error, and that the Report of the Synod had reference to the Great Admiral, and should have spoken of Don Bartholemew, as the brother, who was interred on the opposite side of the Chancel.

The recent discovery of the coffin of Don Luis, Duke of Veragua,

* Synodo Diocesana del Arzobispado de Santo Domingo celebrada por el Illustrissimo y Reverendissimo Sr. D. Fray Domingo Fernandez Navarrete. Anno de 1683, dia 5 de Noviembre.

&c., about which no controversy is raised, relieves the author of the Report of the Synod of 1683 from the charge of inaccuracy, to which he was supposed in 1795 to be justly liable, and it enables us to invoke the Report as evidence that there were two Cristoval Colons interred in the chancel, on the gospel-side of it, to wit, the Great Admiral and his grandson, the brother of Don Luis. Of course it is still possible that the author of the Report of the Synod of 1683 may have made a mistake, but it does not seem to have occurred to the officers of the chapter, who directed the recent exhumations, when they discovered the remains of Don Luis, that the inscription on his coffin was a mistake. On the contrary, they at once accepted the coffin as the coffin of Don Luis, and proceeded with their excavations in the expectation of discovering another coffin, and their expectations were not doomed to be disappointed. After following up their excavations in the direction indicated to them by one of the canons of the cathedral, they discovered another coffin or urn, on which was inscribed the name of "The Illustrious and Noble Baron Don Cristoval Colon."

Bearing in mind the fact above mentioned, that there was a statement of the Synod of 1683, that the bones of Don Cristoval Colon, with those of his brother Don Luis, were interred in the chancel of the cathedral, an impartial spectator would have felt no surprise at the discovery of a coffin on which was inscribed the name of Don Cristoval Colon, notwithstanding the coffin of the Great Admiral had been removed to the Havana in 1795. Further, as the family of Columbus had attained to ducal rank in the lifetime of the second Don Cristoval, who, through his mother, Donna Maria de Toledo, the niece of the famous Duke of Alva, was himself of noble lineage, the description of the tenant of the coffin as "Illustre y Esclarecido Varon Don Cristoval Colon" would have once suggested, that the remains were those of the grandson of the Great Admiral, to whom such epithets were appropriate. But a totally different theory has been built up on the discovery of this coffin, and it is contended that it is the coffin of the Great Admiral himself, and that the Spanish authorities, who carried away to the Havana in 1795 what they believed to be his remains, were the victims of a blunder or of a fraud. The

burden of proof of this astounding fact rests upon the Bishop of Orope, whose pastoral letter we presume to be a voucher on his part before the civilised world, that he has a firm belief in the general honesty of the transaction.

We will now proceed to consider the details of the discovery, which we collect from the Bishop's pastoral letter, of 10th September, 1877, and from the Report of the Royal Academy of History of Madrid. On the 10th September, the director of the works announced to the Bishop, that the workmen had discovered a second coffin or leaden case, well preserved, about 42 centimetres in length, 20½ in breadth, and 20 in depth, and that it was full of human remains, well preserved, and amongst them was a bullet of lead; that there were inscriptions on the lid, outside and inside, and at either end, and on the back. That on cleaning the inscriptions there had been deciphered on the inner side of the lid, "Ill$^{tre.}$ y Es$^{do.}$ Varon Don Cristoval Colon;" on the upper side, "D. de la A. P$^{er.}$ A$^{te.}$;" and at either end and on the back, "C. C. A." These inscriptions, when extended, have been thus interpreted, "Illustre y Esclarecido Varon D. Cristoval Colon," "Descubridor de la America, Primer Almirante;" and the initial letters have been taken to signify "Cristoval Colon Almirante." A metal plate is also represented to have been found inside the chest amongst the bones, with an inscription on one side, "Una parte de los restos del Primer Almirante D. Cristoval Colon Descubridor;" and on the other side, "Cristoval Colon." Such is the substance of the alleged discovery, upon the announcement of which the Bishop without any delay summoned together all the local authorities of Santo Domingo, and on the same day celebrated a solemn religious service of thanksgiving for the discovery of the true remains of the Great Columbus. We do not propose to weigh minutely the various matters of detail, upon which the Report deservedly lays stress in connection with the precise parts of the chancel, in which the coffin of Don Cristoval was found. If it was found in the precise spot which tradition has assigned to the Great Admiral's remains, it must have been found on the spot from which a coffin had been removed in 1795, which was believed to contain the remains of the Great Admiral, and there

is no difficulty in supposing that the grandson's coffin may have been subsequently transferred to the higher place of honour vacated by his grandfather. There is at least far less difficulty in this supposition than in believing, that the authorities in 1795 carried away another coffin than that of the Great Admiral from another spot than that which an unvarying tradition designated as his burial place. On the other hand, if the recent transaction is tainted with fraud, the transfer of the grandson's coffin to the vacant burial place of his grandfather would be a simple operation, and its re-discovery in the presence of the Bishop of Orope would be part of the comedy.

We are accordingly disposed to think, that the place where the coffin is represented to have been discovered is not of primary importance in deciding the question, as to whose remains it contained. The remains themselves, however, require notice, as they are of a character totally different from the description given of the remains of the Great Admiral by the Dean of the cathedral church in 1783. The Bishop's pastoral letter enumerates more than thirty bones, in fact, almost enough to enable a skilful osteologist to set up the skeleton. But whose skeleton? The *femur* and *tibia* would help according to their entireness in estimating the stature of the individual to whom the series of bones belong,* and the Great Admiral, we know, from Herrera's statement, was tall of stature and of imposing presence, but any nearer approximation to identity would not be possible. But if it were possible to set up the skeleton, it could not well be that of the Great Admiral, as his remains are reported upon trustworthy evidence to have consisted in 1783 of dust and ashes, amongst which only the small bones of a fore arm could be recognised. No mention is made in the Report

* We quote on this point the opinion of Professor Richard Owen, F.R.S., than whom there is no greater living authority on the subject. He has kindly favoured us with the English equivalents of the Spanish names of the bones. They are the arm bone, the thigh bone, with great trochanter and condyles, small bone of the leg, small bone of fore arm, collar bone, fore arm, eight ribs, two portions of the pelvis, two lumbar vertebræ, three dorsal ditto, two heel bones, a hand bone, a forehead bone, great bone of the leg, &c.

of 1783 of any leaden bullet having been observed amongst the remains, and there can be no doubt that the coffin lately discovered is not the coffin which was examined by the canons of the cathedral church a century ago, and was reported by them to contain the remains of the Great Admiral.

We may next proceed to consider the character of the case or chest, in which the bones were found so well preserved, and the various inscriptions on it. It should be borne in mind that the coffin of the Great Admiral must have been deposited in the wall of the cathedral church somewhere in the course of 1541. Don Luis had agreed in the preceding year to refer to arbitration his law suit with the crown of Spain respecting the hereditary Vice-Royalty of the Indies, and had been meanwhile declared Captain-General of Espaniola, whereupon he sailed to Santo Domingo and superintended the interment of his grandfather's remains in the chancel of the cathedral. He had not, however, at that time renounced all pretensions to the Vice-Royalty of the Indies, nor had he as yet accepted in its stead the titles of Duke of Veragua and Marquis of Jamaica. It is open to some doubt, therefore, whether, under these circumstances, he would have described his grandfather's remains as those of "the illustrious and noble Baron Don Cristoval Colon," and this doubt is by no means removed by the character of the letters in which the inscription is set up. They are German gothic characters, such as were not used in Spain in monumental inscriptions in the early part of the sixteenth century, Roman characters being then generally in use, and, further, the characters themselves do not commend themselves as of that epoch to the judgment of two of the most skilful experts in London, who have favoured us with their opinion upon the fac-simile which is appended to the Report. There is, in fact, one letter, the "t" in the word "Cristoval," which arrests attention as a stranger to the early part of the sixteenth century, but such an incident, although it might be a fatal objection in handwriting, is not of the same weight where the letters are engraved. But we come to greater difficulties when we have to deal with the abbreviated inscription on the upper side of the lid, which is interpreted to mean, "Descubridor de la America" (discoverer of America).

To those who are familiar with the discoveries of Columbus, and the circumstances under which the name of the Florentine Amerigo Vespucci first crept into use, and ultimately superseded that of Columbus, it will cause considerable surprise to be asked to believe, that the grandson of the Great Admiral caused his grandfather's remains to be described, when he interred them in 1541, as those of "the Discoverer of America." Amerigo Vespucci was a *protegé* of Bishop Fonseca, the bitter enemy of Christopher Columbus, and on the death of the latter he was nominated as his successor in the post of "Pilot-Major" of Spain, Bishop Fonseca being at that time President of the Council of the Indies. Vespucci did not hold his office very long, as he died in 1512. Mr. R. H. Major, F.S.A., the keeper of the Department of Maps and Charts in the British Museum, and Honorary Secretary of the Royal Geographical Society of London, has traced with great care, and in minute detail, in his "Life of Prince Henry the Navigator," the mode adopted for giving to the New World the name of Vespucci, instead of that of Columbus.* It is, perhaps, the most remarkable instance on record of the power of the printing press, of the youthful Hercules, if we may use the expression, whilst still in his cradle. A small circle of priests having established at St. Dié, in the Province of Lorraine, a gymnasium or college, and also a printing press, under the auspices of René II., Duke of Lorraine, issued, in 1507, a little book, entitled "Cosmographiæ Introductio," which purported to contain four voyages made by Amerigo Vespucci, in the first of which, as asserted to have taken place between May, 1497, and October, 1499, Vespucci is represented to have discovered not only the north coast of South America, but a large extent of the coast of North America also; and in this little book it is suggested that the name of "Amerige," or "America," should be given to the newly-discovered Western World. It is from this acorn that the oak has sprung up, which has spread its branches over both the Northern and the Southern Continent of the New World, but

* Mr. Major has also carefully discussed this subject in the Introduction to his "Letters of Columbus," which he has published amongst the Works printed for the Hakluyt Society. 2nd Edition. London. 1870.

does not include under its shade the islands which are washed by the Equatorial current, which assisted Columbus to discover the Indies of the Western Hemisphere.

Our space will not allow us to trace the gradual steps by which Germany and Holland, and Italy, became familiarised with the name of America and introduced it into their charts, but Spain did not accept it with equal alacrity, and it is stated in the Report of the Royal Academy of History of Madrid, that the earliest Spanish book, in which the term "America" is used, was printed in Seville in 1672, and is entitled, "Norte de la contratacion de las Indias Occidentales." The auther of this work, Don José de Veitia Linaje, in making use of the term "America," has taken care to inform his readers, that it was a new name hitherto not much in use. The best evidence, however, that is forthcoming as to the title, by which the grandson of the Great Admiral would have been likely to describe the remains of his grandfather in 1541, is furnished by the epitaph, which is inscribed on the sepulchral slab, which marks the place of burial in Seville Cathedral of Don Fernando Colon, the youngest son of the Great Admiral, who died in 1539. "Here lies the magnificent Don Fernando Colon, who bequeathed to this city his valuable collection of books of every science. He died in this city on 12 July, 1539, at the age of fifty years and nine months and fourteen days. He was the son of the valiant and memorable Don Cristoval Colon, the First Admiral,* who discovered the Indies and the New World, in the lifetime of their Catholic Majesties Don Ferdinand and Donna Isabel of glorious memory, &c." The substance of this epitaph had been suggested by Don Fernando himself in his will, in which he desires that his epitaph should simply run thus:—Here lies "Don Fernando Colon, the son of Don Cristoval Colon, the First Admiral who discovered the Indies, &c." What the traditional feeling of the family of Columbus has been as to the proper designation of the Great Admiral, may be gathered from the letter of thanks addressed by the Duke of Veragua in 1796 to the Corporation

* "Fué hijo del valeroso y memorable Señor Don Cristoval Colon, primero Almirante, que descubrio las Indias y nuevo mundo."

of the city of the Havana, after their reception of the remains of his great ancestor, in which the Duke thanks them for the marks of distinction and respect with which they had received the remains of Don Cristoval Colon, "the Discoverer and Conqueror of the New World, the Great Admiral of the Ocean, the First Viceroy and Governor of the Indies." Further, the characters of this inscription are still more unsatisfactory than those of the inscription inside the leaden case. They are not German-Gothic characters, but Roman characters of the same kind as those in modern use, and the letter "D," which has been interpreted to signify "Descubridor," has, in the opinion of the experts above-mentioned, anything but a sixteenth century look about it. As regards the remains themselves, which have been found so well preserved within the newly-discovered coffin, they may well have belonged to Don Cristoval Colon, the grandson of the Great Admiral, as his remains have undergone no disturbance as far as any record exists, since they were interred in 1572. On the other hand the remains of the Great Admiral have undergone three journeys overland and a voyage across the Atlantic, a combination of disturbances which would fully account for the condition of dust and ashes to which his remains appear to have been reduced in 1783, according to the Report above-mentioned, of which the veracity was regarded, until the 10th September, 1877, as unimpeachable.

There remains, however, the leaden bullet to be taken into account, which is reported to have been found amongst the bones, and to be of the weight of an ounce. It has been suggested that the Great Admiral may have received a wound with such a bullet in his early life before he entered into the service of Spain, in 1486, and that it had lodged so deeply that it could not be extracted. This is a possibility, and in support of this theory a passage has been quoted from a letter to the Spanish Sovereigns, in which Columbus gives an account of his fourth voyage, and in which he says, "my wound re-opened, and for nine days my life was despaired of." But this passage does not furnish any substantial support to the theory, as the Spanish word "llaga," which Columbus uses, and which is the same as the Latin word,

"plaga," and the French word "plaie," signifies a wound made with a cutting instrument. On the other hand the Spanish word "herita," from the Latin verb "ferio," signifies a wound made with a blow, such a wound for instance as would be caused by a bullet fired from an arquebuse or a musket.* It is not to be overlooked that no mention has ever been made by Columbus himself of his having been wounded by a bullet, neither does his son Don Fernando speak of any such event in his history of his father's life. On the other hand his grandson, Don Christopher, was a soldier by profession, and his death seems to have been unexpected, as we find him named by his brother, Don Luis, as the executor of his will dated at Oran, 26 January, 1572, yet he was dead before Don Luis died, and his son Don Diego succeeded to his uncle's title of Duke of Veragua. Besides, the use of bullets of this size was common in the time of the grandson, whilst in the middle of the fourteenth century the arquebuse carried a ball of heavier weight than an ounce, and the musket had not been at that time introduced.†

Such is a brief review of the evidence as regards the tenant of the coffin, which was disinterred within the chancel of the cathedral of Santo Domingo, on 10th September, 1877. The Report presented by the Royal Academy of History of Madrid to the Spanish Government is adverse to the Bishop of Orope's contention, that the coffin contains the true remains of Christopher Colombus, the discoverer of the New World. The historical facts, which we have grouped together, establish beyond a doubt that there were two coffins interred on the right-hand side of the chancel at Santo Domingo,

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* "Alli se me refresco del mal la llaga; nueve dias andrede perdido sin esperanza de vida." Letters of Christopher Columbus, published by R. H. Major, F.S.A., for the Hakluyt Society, 2nd edition, London, 1870, p. 185.

† Napoleon III., in his "History of Artillery," says that muskets first came to exercise an important influence at the battle of Pavia in 1525, and the great Duke of Alva introduced the musket in the place of the arquebuse in his memorable campaign in Holland of 1567-1568. There is no firearm in the collection of the Tower of London of the 15th century, which would take a ball so light as an ounce in weight.

each containing the mortal remains of a Christopher Columbus, to wit, the Great Admiral and his grandson. If the newly-discovered coffin contains the remains of the grandson, we know where the remains of the Great Admiral are deposited, to wit, at the Havanna. If, on the other hand, the coffin contains the remains of the Great Admiral, where is the coffin of the grandson? No one has yet has been so bold as to say that the Spaniards carried away in 1795 the remains of the grandson in the place of the remains of the Great Admiral.

The Report suggests that the judgment of the Bishop of Orope may have been unduly biased by his desire to procure the beatification of the Great Admiral, respecting which a postulant has already submitted his petition to the Holy See, and by his hope that the shrine of Columbus in Santo Domingo would become a place of pilgrimage for mariners, as famous in its way as the shrine of St. James the Elder at Compostella, in old Spain. Already small vials containing ashes from the urn of the Great Admiral have been exhibited at Genoa, which claims to be his birthplace, and at Boston, in the United States of America, and alms are being solicited from the faithful to build a sumptuous monument to the Great Admiral in the cathedral of Santo Domingo. They used to show some fifty years ago to juvenile students at Oxford a skull, which the sub-custodian of the Ashmolean Museum humorously described as one of the skulls of the Protector Oliver Cromwell. The result was so far harmless, inasmuch as the neophyte was only laughed at by his fellow students, when he told them how he had commenced his studies in natural history. In the present case the mischief will be of a more serious character, if the Christian mariners of the West Indies are to be permanently perplexed by having to decide which of the two bodies of Christopher Columbus is the true body of the discoverer of the New World. We think that the evidence at present forthcoming is insufficient to displace the established belief, that the remains of the Great Admiral were transported to Cuba in 1795, and that they are deposited at the present time in the chancel of the cathedral church of the Havana. The landmarks of history ought not to be rashly disturbed, and the Spanish Government has done a service to the civilized world in

publishing without delay the Report of the Royal Academy of History of Madrid, and in making known their confidence in the conclusions of that Report, which are adverse to the alleged discovery.

TRAVERS TWISS.

SHIPOWNERS versus THE BOARD OF TRADE.

THE "DORA" CASE.

IN our May number we briefly referred to the important legal decision given in the case of the *Dora*, but as an appeal for a new trial was awaiting hearing before the High Court of Justice at the time of our last issue, we did not feel justified in offering any comment upon the merits of the question in dispute. That appeal has now been heard, and we therefore purpose to give a brief summary of the leading facts brought to light in the course of the trial and hearing, and to consider the probable future bearing of the judgments that have been delivered. The history of the *Dora* case must be tolerably well known by this time to most persons who are at all interested in shipping. We shall therefore confine ourselves to giving only such an outline of the circumstances connected with the detention of that vessel as will enable us to form an estimate of the points on which the decisions of the two Courts seem chiefly to have turned.

The *Dora* was built under Lloyd's survey in 1863, and classed A1 for 10 years. In June, 1876, when she had, of course, run out of her class for some considerable time, her owner, Mr. Kain, was offered a charter to send her in ballast to Trinidad for a cargo of 375 tons of asphalte, to be filled up with cocoanuts. This charter was accepted, and is dated 7th June. On the 13th June the vessel was put in dry-dock for general repairs. The repairs made in dry-dock do not, however, appear to have been extensive, for on the 15th the *Dora* was again in the river, and on the 19th her owner engaged Captain Sharman as master for the coming voyage. On the 23rd the crew (at least eight of them) were engaged, the

Articles of Agreement stipulating the 26th June as the time when they were to be on board. On the 24th June, Captain Wilson, principal officer to the Board of Trade for the Port of London, and Mr. Waterson, one of the Board's shipwright surveyors, visited the vessel and reported her as unseaworthy, on the ground that her equipments were insufficient and defective. On the 26th June, Mr. Kain proceeded to Whitehall for the purpose of protesting against the detention of his ship, but his protest was without effect and the vessel was ordered to be detained. Of the extraordinary account given by Mr. Kain of his interview with the Marine Secretary, we shall have occasion to speak hereafter. On the 27th, the surveyors made a second report, giving a list of certain defects in the masts, yards, and rigging, and on this report the Board of Trade issued a further order to the effect that the ship should be detained until she had been repaired to the surveyors' satisfaction. With regard to the nature of the interference of the surveyors at this stage, there exists a considerable conflict of opinion. It appears that Mr. Kain, after engaging Captain Sharman, handed him a list of certain requirements which had been prepared by the late mate of the vessel, leaving it to him to decide what was necessary to be done. But when the surveyors appeared on the scene, after the issue of the further order for detention, they prepared a list of requirements which Mr. Kain considered extravagant, and also, as that gentleman contends, acted generally in a high-handed and unreasonable manner. We shall not attempt to discuss the respective merits of the requirements Captain Sharman considered necessary, and of those on which the surveyors insisted. The main question does not turn on these, and it will be sufficient if we point out, with regard to the action of the surveyors, that the Board of Trade were not prepared to contend that neither of their officers had erred on the side of zeal. Mr. Abbott was admitted to have made a grave mistake in requiring the removal of the beam fillings—indeed, he admitted his error himself in the most unqualified manner—and the Board were not unwilling to make compensation for the damage thus unnecessarily caused. However, as the decision arrived at by the Court does not seem to have been influenced at all by the extravagance or otherwise of the surveyors'

requirements, this is a point on which it is unnecessary to dwell.

Mr. Kain on finding that he was unable to extricate his vessel from the official grasp without making considerably more extensive repairs than he had intended, determined to re-class her at Lloyd's. He wrote a letter to that effect to the Board of Trade, apparently under the impression that he would thus free himself from the surveyors' supervision, but only to find that his troubles were by no means at an end, for the ship was to be detained until repaired to the surveyors' satisfaction, and not before that was done would she be released.

In the course of the trial it was contended by Mr. Watkin Williams and Mr. Cohen, who appeared on behalf of the plaintiff, Mr. Kain, that the power conferred by Parliament upon the Board of Trade, with reference to the detention of unseaworthy ships, is a judicial power, and cannot be delegated to any irresponsible person. It was maintained that the Board possess absolute power with regard to such vessels, and that this power is limited by no qualification, except their own judgment and sense of what is right. The plaintiff's counsel argued that it was only on the assumption that such judgment would be exercised that these vast powers were conferred on the Board, and expressed the opinion that no better illustration of the vice of allowing that department to delegate such powers could be found than the case in dispute—a case in which the surveyor acted injudiciously, and in which the officer, to whom it was assumed that those powers had been delegated, declined to over-ride the error made by his subordinate. And even assuming that the officers possessed legal authority to interfere with and detain unseaworthy ships, it was contended that this was a case in which interference could not be justified. The ship was not about to proceed to sea. She had been chartered for a voyage, it is true; her master and crew had been engaged; but the master had been furnished with a list of requirements, from which he was at liberty to select such as he considered necessary, while, although the crew were bound to be on board within two days (practically one day, as a Sunday intervened) from the time of the surveyors' first visit, it was absurd for those officers to suppose that there was any intention on

Mr. Kain's part to send the vessel to sea. The crew were required to assist in preparing the rigging, sails, &c., but not to immediately proceed on the voyage. According to the counsel's view, the Marine Secretary, on being told by Mr. Kain that the ship was not about to proceed to sea, should have said, "I have no reason to doubt your word; you are a decent, agreeable man; what you say may be true or not true. I have a complaint made to me from Captain Wilson; I will send some one down with you to see what is required."

Further than this, it was pointed out that the list of requirements held by Captain Sharman embraced all the repairs necessary to render the vessel's equipments complete and seaworthy; that nothing was defective in the condition of the hull; and that, consequently, Mr. Abbott's interference with the general framework of the ship was totally unjustifiable. Considerable weight was given to the fact that Mr. Abbott declined to pay any regard to the requirements of Lloyd's surveyors, but insisted on satisfying himself that the requisitions he considered necessary were being attended to. The chief contentions on which the plaintiff's counsel grounded his case, however, were that the Board of Trade had not delegated their power to the Marine Secretary, Mr. Gray, and that, although Sec. 7 of the Merchant Shipping Act 1854 rules that an order purporting to be issued by the Board's authority, shall be deemed to have been issued under such authority, unless the contrary be shown, he had proved by Mr. Kain's evidence that the order for the detention was issued in this case by Mr. Gray on his own responsibility, and without any exercise of discretion or judgment.

In opposition to this line of argument, the Solicitor-General and the Attorney-General, who appeared for the Board of Trade, pointed out that if the Board had really taken no part in the matter—that if the order for detention had been issued without their authority—then they could not be held responsible for any damage or injury caused by the illegal interference of their officers. But this was a point for which the Board had no wish to contend. They were prepared to accept the full responsibility for the

directions given by Mr. Gray, and on their behalf the Solicitor-General invited the jury to assess such damages as they might think appropriate, if they were of opinion that Mr. Abbott had been guilty of an excess of zeal, or had shown an error in judgment in the performance of his duty. With regard to the theory that there was no intention on Mr. Kain's part to send the vessel to sea at the time of the surveyor's first visit (the 24th June), and that consequently there was no reason for their interference, it was maintained that the fact of the crew having been engaged, and of their having agreed to be on board on the 26th, was of itself good evidence of such intention, whilst Captain Wilson's diary contained an entry to the following effect: "Master *Dora* called. . . . Said vessel would have sailed on the 26th, as pilot and tug were engaged, but pilot disappointed him, and before he could engage another pilot, vessel was detained." Further than this, the report made by the surveyors with regard to the question of seaworthiness left the Board of Trade no option. They were compelled to order the detention of the vessel, unless they had good reason to believe that the report was entirely false. If they had declined to interfere on receiving such a report, and a casualty had subsequently happened to the vessel on account of her defective equipments, they would have been guilty of a gross omission of duty, and would have laid themselves open to the severest censure. On behalf of the plaintiff it had been argued that the Board of Trade, on learning that the vessel was to be re-classed at Lloyd's, should have relaxed their supervision, and should have satisfied themselves with the assumption that Lloyd's requirements would be all that were needful to render the ship perfectly seaworthy. But neither the Board of Trade nor their surveyors can divest themselves of the responsibility thrown upon them for seeing that vessels under detention for unseaworthiness are properly repaired and equipped.

The defence put forward on behalf of the Board of Trade was grounded on the theory that the detention was perfectly justified, and in due order, looking to the nature of their surveyors' reports and to the facts which induced the belief that the vessel was about to proceed to sea. If an error had been made it had

been made by Mr. Abbott only, and it remained for the jury to decide as to the amount of the compensation, if any, which they might consider to be due.

In the course of his summing up, Lord Coleridge instructed the jury that the case was plainly one in which the Board of Trade had a right to interfere. To use his own words, "Whether the plaintiff's or defendants' view of the facts be correct, at any rate the jurisdiction of the Board of Trade arose. It was a case in which the Board of Trade had a right to issue this order." It was left to the jury to decide whether the powers of the Board had been abused. The important point, however, was whether the Board of Trade had interfered, or whether the Assistant-Secretary to the Marine Department of that Board, Mr. Gray, was not alone responsible for the interference. He referred to Section 7 of the Merchant Shipping Act of 1854, which rules that all documents purporting to be written by, or issued by or under the direction of the Board of Trade, shall be deemed to be written by or issued under such direction, "unless the contrary is shown," and said that this Section must be construed with the Act of 1873, and must be regarded as if it formed a part of the later Act. On this point Lord Coleridge remarked—"In this case it is quite plain that the Board of Trade, as the Board of Trade, have done nothing. The only person who has been put forward, and the person who really did the whole of this matter was Mr. Gray. . . . . Now you must say really for yourselves whether there is not, I will not say conclusive, but whether there is not the strongest proof of 'the contrary,' or of the Board of Trade having ever had anything more to do with this detaining document (which is the foundation of the whole proceedings) than the man in the moon. They are never consulted—there is no proof, no suggestion that this is the ordinary course of business—no officer of the Board of Trade comes to say that he adopts it—no one has come here, not even Mr. Gray himself—no one has come before us at all to say that this is the ordinary practice of the Board of Trade—that the Board of Trade adopts this—that the Board of Trade have considered this afterwards and ratified it, even if that would do—nothing of the sort. There is the detaining order, which is

the foundation of the whole jurisdiction, and there is a witness, and Mr. Sharman substantially confirms him, who says that they went to Mr. Gray, whose name is signed at the foot of the document, which founds the whole of the proceedings in this case. Mr. Gray said he was using no discretion, and he signed the document without any report at all. Gentlemen, I must say that this is the stronger because it came out from one of the law officers of the Crown (I forget which) yesterday that Mr. Gray had been here several hours in Court. There is that witness-box, and in that witness-box Mr. Gray has never shown." After delivering himself of this somewhat pointed expression of opinion, his lordship said: "The question I shall leave to you here upon this part of the case is, whether 'the contrary' has been shown."

Assuming that the Board of Trade had authorised the detention of the vessel, as they undoubtedly had a right to do, the interference of the surveyors, however excessive and unreasonable, would not render either the surveyors or the Board liable for damages so long as it was exercised in good faith and without malice or corrupt motive. On the 26th June the ship had been entered outward, her crew engaged, and she was certainly ready to start. The surveyors were therefore justified in interfering, and unless the jury were of opinion that they had abused the authority of the Board in the course of their interference, the Board would not be liable. The whole question at issue might be narrowed down to two points, viz., (1.) was the order for detention issued in the manner prescribed by the Act, and (2.) had Mr. Abbott wantonly and corruptly exercised his powers?

On the first of these two points the jury grounded their verdict, by finding that the order for detention had not been issued under the authority of the Board of Trade, and assessed damages to the extent of £1,600, the defendants being also condemned in the costs of the trial.

Against this decision the Board of Trade appealed, by applying to the Common Pleas Division of the High Court of Justice for a new trial. Both parties were represented by the same counsel who appeared for them at the former trial, the case being argued before Lord Coleridge, Mr. Justice Denman, and Mr. Justice Lindley.

The arguments lasted four days, but on the fifth a compromise was made, on the Solicitor-General intimating to the Court that the Board of Trade were prepared to admit their moral liability in this particular case, provided it was clearly understood that they admitted no legal liability. They were willing to concede that a certain amount of hardship had been inflicted on Mr. Kain, and would leave it to the Court to decide what amount of compensation should be made ; but they did this solely on the understanding that, on legal grounds, they were prepared to contest the case at every point. Thereupon, Lord Coleridge expressed his thorough approval of the course suggested, and delivered the judgment of the Court to the effect that the amount of damages (£1,600) agreed on by the jury at the previous hearing should be paid. In doing so, he expressed the opinion that the regular proceedings of the Board of Trade, their forms, and the machinery they use, are all perfectly fair, just, and legitimate, but that in the case of the *Dora*, those proceedings and forms had not been adhered to. He suggested that the departure from the "just and salutary orders of the Department" might have arisen from the "great pressure and hurry and so forth on the part of the gentleman who had the conduct of the ordinary business of the Board of Trade;" but, at all events, there had been such a departure, and why should the Board dispute about it? The more the matter was pursued, the more it appeared to the Court that it resulted, not from any fault of the Department, but from a slip in carrying into effect the ordinary and proper regulations.

It will be readily seen that the very grave importance attaching to the decision given by the jury at the first trial has been largely reduced by the compromise made before the High Court of Justice. Had the first ruling remained entirely undisturbed, it is difficult to see any limit to the liability that would have been suddenly thrown upon the Board of Trade. The Board exists only in theory—indeed, it required a considerable amount of musty research to prove even its theoretical existence, as was shown in the course of the trial—consequently, every ship which has been detained under the authority of one of its secretaries must, according to this decision, have been detained illegally, and

the amount of damages for which it would have been rendered liable would probably be such as to fill the heart of the Chancellor of the Exchequer with dismay. Fortunately for the tax-payer, the Government have as yet escaped without admitting their legal liability, and intending litigants, who may contemplate following Mr. Kain's example, will have to engage counsel and commence *de novo* before they will be able to share in the damages thus temptingly dangled before their eyes. Certainly they would have good grounds for anticipating victory, for Lord Coleridge has expressed his opinion, in the plainest words possible, that the course adopted with regard to the detention of the *Dora* was not the proper and legitimate course; but that this course was not the usual one there seems to be no reason to doubt.

It is impossible to examine the leading arguments of the plaintiff's counsel, or the summing-up of the judge, without coming to the conclusion that the legal representatives of the Board of Trade erred seriously in not attempting to defend the point against which the main attack on their position was led. The adverse verdict seems to have been given almost entirely on the ground that the authority for the detention had not been issued under the authority of the Board. We have quoted at some length from the summing-up to show what was running in Lord Coleridge's mind. He pointed strongly to the fact that it had not been proved, or even suggested, that it was the usual course of business for an Assistant-Secretary to issue a detaining order—that no one, not even Mr. Gray himself, had come before the Court to say that that was the ordinary practice of the Board. And looking to the extent to which the plaintiff's case was based on the assumption that the authority of the Board of Trade itself was necessary in order to render the detention legal, it seems extraordinary that neither the Solicitor-General nor the Attorney-General made any attempt to defend the course adopted. Lord Coleridge seemed even to the last to have been under the impression that this course was a slip—a kind of inadvertent departure from the usual mode of procedure, and it is by no means difficult to see whence this impression was derived. Mr. Kain had given evidence to the effect that the order was signed by Mr. Gray in his presence,

while the Solicitor-General carefully avoided all reference to the question whether Mr. Gray possessed any general authority to issue such a document; it may therefore be presumed that, from a legal point of view, the Court were bound to take it for granted that "the contrary" had been proved, and that the ship had been improperly detained. Hence the verdict for the plaintiff, and if half-a-dozen similar cases were to be tried on this negative line of defence, it is impossible to doubt that they would all give similar results. In suggesting the compromise, the Solicitor-General declared that he did so without admitting any liability, and that he declined to fight with his hands tied. He appears to us to have fought with one eye shut, and that eye on the side on which he was being attacked.

And this brings us to another consideration which must not be lost to sight in this important case. In appearing for the Board of Trade the Solicitor-General occupied a somewhat different position from that of counsel for a private individual. As a law officer of the Crown, representing a public Department, it might be supposed that while striving for a favourable verdict, he would at the same time have paid some regard to the influence which the trial might be likely to have on the moral position of the Department for which he was pleading. But no such consideration as this seems once to have entered his mind. Mr. Kain's evidence with regard to the manner in which business is transacted in the Marine Department of the Board of Trade has gone forth unchallenged and uncontradicted. He asserted that the Marine Secretary declared his intention of stopping the ship whether rightly or wrongly, and if wrongly the Board of Trade would pay the damages. Apparently influenced by the apprehension that if the Marine Secretary were placed in the witness-box he might be compelled to admit that in this particular case he had received no definite instructions from the Board of Trade to issue an order for detention, the Solicitor-General allowed this statement to pass unnoticed, and the consequence has been that on all hands it has been accepted as a correct version of what took place. At all events we can place no other construction on the persistent manner in which the counsel for the defence avoided any attempt (either in their pleadings or in the

evidence they produced) to rebut the contention that Mr. Gray's action was not in the proper course. It may be that the first duty of the Solicitor-General was to win his case, but it cannot be admitted that this was his only duty. The result of the trial has plainly shown that, even from a legal point of view, he made an error in not attempting to show by evidence that the mode of procedure adopted in this particular case was not exceptional. And the end of it all is that the Board of Trade have lost the verdict and have had to sacrifice their credit, while the country has been mulcted in several thousand pounds for damages and costs in the bargain.

Throughout the whole of this long and severely contested case, the most unfortunate position has certainly been that of the Marine Secretary, Mr. Gray. He has been compelled calmly to listen to the most damaging assertions against his credit as a public officer, whilst the legal requirements of the defence, as interpreted by the Solicitor-General, have prevented him from entering the witness-box to say a word in reply. Taken by itself, Mr. Kain's account of his interview with Mr. Gray is fairly specious, but we have no doubt that if Mr. Gray had been allowed to give his version of the affair, matters would have assumed a different aspect. We imagine that Mr. Gray must have gone through the ordeal of being interviewed by aggrieved shipowners too often to be likely to lose his usual self-possession over such meetings. In Courts of Law, the statements on one side are always tolerably plausible until those on the opposite side have been made; but in this case, unfortunately for Mr. Gray, the statement was allowed to remain a one-sided one. It may be that this is no place for vindicating the acts of public officials, but in common fairness to Mr. Gray, we cannot allow the opportunity to pass without a reference to the circumstances which obviously—at least so far as we can form an opinion from the report of the trial—led to his being placed in what must have been a most trying position. Personally, he was of course unrepresented by counsel. The main object of the Solicitor-General was to defend the Board of Trade, and, with this end in view, he evidently deemed it best to say nothing, and to allow nothing to be said with regard to the action (if any) which

the Board itself took in the affair. The judge adverted strongly to this silence, taking it for granted that an unusual "slip" had been made, and the consequence is that the Board have lost the verdict while their Marine Secretary has been compelled to undergo a series of hostile attacks and criticisms, without being allowed to say a word in his own defence. In alluding to this feature of the case, Lord Coleridge said :—

"It may be . . . that to summon a meeting of the Board of Trade with the Bishop of London and the rest of them, before a ship is detained, which is lying at the buoys in the Thames, would be practically impossible, that the Act could not be so worked, but that everything has been done here according to the ordinary course and practice of the office, but that is not proved."

Ordinary mortals will readily perceive the force of his lordship's supposition as to the impossibility of summoning Bishops "and the rest of them" to detain rotten ships, and they will probably be also inclined to inquire what would be the practical use of such a Board when it had been summoned. But apparently his lordship still clings to the idea that this Board has a practical existence, and that it was only through an inadvertent oversight caused by the hurry of business that the *Dora* case was not investigated before a solemn meeting of its members. As we said before, if there are any shipowners who may wish to follow Mr. Kain's example, it is the fear of the cost that is most likely to deter them. They certainly would not hesitate on account of the possibility that in their cases the Bishop of London or any of "the rest of them" took a part in ordering the detentions.

It is quite possible that there exists among the public a considerable amount of misapprehension with regard to the manner in which business is administered by boards and public departments generally. As a writer in the *Statist* remarked a short time since, *apropos* to this particular case :—

"There is an idea abroad that when Parliament gives a Government department powers to interfere with some trade or business in what are supposed to be public interests, there is some mysterious entity called a Board or an office which contains in itself an unlimited fund of experience and wisdom, backed by the

responsibility of a Cabinet Minister, all of which is brought to bear before the powers of interference are put in motion. Nothing can be more unfounded. Whether it is a ship to be stopped; or a railway not allowed to open; or a cargo of diseased cattle to be slaughtered; or an account of a bank or insurance company to be overhauled, and its credit blown upon, it is the shipwright surveyor, the engineer, the veterinary surgeon, or the accounting clerk employed on the particular occasion, who really sets the department in motion, and decides on the exercise of its powers. It cannot be otherwise. The superior officers holding the permanent places in the department may exercise caution in appointing the subordinate officials, and in judging generally of the value of their opinions; but they can form no judgment on the particular case. They are in the hands of their subordinates. Still less can the Minister, or that mysterious and non-existent entity called a Board or a department, exercise any judgment or control. In fact the real value of the opinion or action will probably be less in proportion as it comes from a higher quarter. The surveyor who has seen the ship knows more than the Assistant-Secretary, the Assistant-Secretary knows more than the permanent head, and the fleeting Minister less than all, of the technicalities which are necessary to a right decision. Even the general control supposed to be exercised over subordinates is exaggerated. Nothing is more difficult than to dismiss an incompetent or rash subordinate, unless some very grave and distinct charge can be proved against him. When, therefore, Parliament gives enormous powers over particular trades, it should be remembered that they will be exercised by subordinate officials—often with small salaries, open to great temptations, not the least of which is, in such a case as the Plimsoll agitation, to be excited by the prevailing public opinion into mischievous activity. Interference is necessary in certain cases, but it ought to be sparing, cautious, and, as far as possible, deliberate. Where it is universal, as a general system of survey and inspection would make it, or feverish and excessive, it is likely to lead to a most dangerous tyranny. We see this in the case of Kain v. Farrer. Mr. Gray, the minor Assistant-Secretary of the Board of Trade, is an exceedingly able man, anxious to do his duty in a creditable

manner, but he cannot himself survey and inspect every ship at every port that is reported to him. The necessity of the circumstances compels him to trust his subordinates and guide his action by their recommendations. They in their turn are, no doubt, competent and well-meaning, but they are liable to be over-zealous, to conceive prejudices, to yield to temptation, and the result is, as in this case, that an upright man may be seriously injured, the Department compromised, and the law brought into disrepute."

For our own part, we have consistently opposed the legislation which aims at controlling the affairs of private individuals by the agency of State Departments. And this case affords a good illustration of some of the evils which must inevitably attend the transfer of responsibility from private hands to those of State-paid officials. No system of Boards that could be devised could ever prevent the risk of abuse; for, as our contemporary points out, the central controlling body must always depend solely on the action of their subordinates. For example, had the twenty-four gentlemen who constitute the Board of Trade, all been in attendance when the surveyor's report in the *Dora* case was received, they would have had no option but to order the detention of the vessel. Mr. Kain's counsel suggested that when his client came to the Board and lodged his protest, Mr. Gray, on noticing the honesty of his appearance and demeanour, should have sent some one down to the vessel to see whether matters really were as he stated. Certainly Mr. Gray might have suggested that one of the great functionaries who constitute the Board of Trade, should make a trip to Fletcher's Dock, but it is very questionable whether his colleagues would have been any the wiser for his visit.

In fact, it is absurd to assume that the work of a Department like the Board of Trade must, of necessity, be administered and directly controlled by the nominal members of that Board. It matters not how the Board may be constituted, whether it be composed of Bishops, shipbuilders, Privy Councillors, sea captains, or soldiers, its line of action must, of necessity, depend on the advice and recommendations of the practical officers who are stationed at the different ports. And, as it plainly must delegate its practical functions to the hands of subordinates, so it is no less reasonable that

it should have the power of delegating the signing of formal orders and notices to the hands of its secretaries. It appears to us that if the Law Officers of the Crown had adopted this line of defence in their pleadings in the *Dora* suit, instead of calmly ignoring their opponent's chief contention, the result might have been less unfavourable for the Government.

That the *Dora* case has excited a considerable amount of interest in the shipping world, is shown by the fact that some six hundred pounds have been subscribed by British shipowners, in response to Mr. Kain's appeal for aid in prosecuting his cause. And there can be no question that, on his side, the suit was most ably and zealously conducted. In fact, the style and general arrangement of the arguments for the prosecution, no less than the result of the trial, point strongly to the conclusion that Mr. Watkin Williams and Mr. Cohen are considerably more than a match for the present legal representatives of the Crown.

THE SCREW-PROPELLER.

FOR the last few years naval architects and engineers have been giving increased attention to subjects connected with the efficiency of the screw-propeller. The important decrease in coal consumption due to the adoption of compound engines has enabled steamers to be profitably employed in very long voyages, and an increased anxiety has been manifested for further improvements in the ship herself, the marine engine, and the propeller, which shall still further extend the area of their employment. A great impetus was given to enquiry upon the subject of the screw-propeller by Mr. Froude's remarkable paper "On the Ratio of Indicated to Effective Horse-Power," read before the Institution of Naval Architects in 1876, and based upon some speed-trials made by Mr. Denny, of Dumbarton. The speed-trials of H.M.S. *Iris* at first appearing to indicate that she was a disappointment, but afterwards on the adoption of a different propeller turning out to be so successful that she is now the fastest sea-going vessel afloat, have been the incen-

tive to much discussion upon the respective merits of single and twin screw steamers; and the competition for a gold medal offered by the late Mr. R. Carlyle for the best paper upon the screw-propeller to be read at this year's meetings of the Institution of Naval Architects has also had some influence in directing attention to the subject. After going through much of what has been written upon the screw-propeller during the last few years, the first thought is that we know really very little about its action, and what we do know appears to some large extent to be but a further development of what was said years ago by the inventor, to whom is due most of the credit of the practical application of the screw-propeller. Almost every year some one brings facts to light about old proposals for the propulsion of vessels by screws, and we believe a short time ago the original invention was shown to be a hundred years old. The cause of the failure of all attempts at its practical application, however, was, that it was improperly placed in the ship, that in fact the engineer required to be supplemented by the naval architect. In former articles in this magazine* it has been pointed out that the gentleman who first grasped the idea that the screw could never succeed unless it had plenty of water to turn in, was Mr. Henry Wimshurst, the designer and builder of the *Archimedes* and the *Novelty*, the first two successful screw-steamers, forty years ago. Still the cry is for more water, and one of the few certainties brought out by recent discussion is that the screw is more successful as the flow of water to it is better secured, and that if it were practicable to carry it at a much greater distance from the after body of the ship, still better results would follow. We propose in the present paper to review briefly the more important contributions of the last few years to our knowledge of the screw-propeller.

For many years rules have been used by the Admiralty and by most shipbuilders for approximating to the speed of ships based upon three assumptions:—

(*a*.) That the non-effective work of the engine is a constant percentage of the indicated horse-power.

* See *Nautical Magazine*, September, 1877.

(*b*.) That the resistances of ships at a given speed vary approximately :—

(1.) As the area of the midship section ;

or, (2.) As the cube root of the square of the displacement.

(*c*.) That resistance varies as the square of the speed, and indicated horse-power as the cube of the speed.

By the non-effective work of the engine is meant that part of the indicated horse-power which is required to work the air-pump, to overcome the resistance of friction in the various parts of the machinery, &c.

Upon these three assumptions are based what are called the Admiralty formulæ for comparing the performances of steamships, and for predicting the speed of new designs. They are—

$$\text{(1.) Indicated horse-power} = \frac{S^3 \times D^{\frac{2}{3}}}{d}$$

$$\text{(2.) Indicated horse-power} = \frac{S^3 \times A}{a}$$

where S stands for the speed in knots per hour, D for the displacement in tons, and A the area of the midship section. The quantities (d) and (a) are divisors which have been deduced from the results of Admiralty or other measured mile trials. Tables have been published giving the value of the divisors in the cases of vessels which have been tried, and the plan adopted in estimating speed is to take the recorded divisor for a vessel as much like the new one as can be obtained. The divisor (*d*) has been found to vary, according to published results, in ships belonging to the Royal Navy from 330 to 725, and the divisor (*a*) from 130 to 270.

In "Rules of Thumb," published in a former volume of this magazine,* was given a rule based upon the Admiralty displacement formula. It is as follows :—"The displacement by the cube of the speed in knots, divided by twelve times the length, is equal to the indicated horse-power."

The Admiralty formulæ have been of great practical value in

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* *Nautical Magazine* for 1873, page 571.

spite of the fact that the assumptions upon which they are based are all false, or perhaps we may say, are only approximately true within narrow limits. They have, however, done some harm because having been for years exclusively used in comparing the performances of screw ships, false interpretations have been put upon results of trials, and vessels have been supposed to do well simply because the formula when applied to the results of their trials, gave a large value for the constant. In other words, it would be said that for so much indicated horse-power, a certain resistance was overcome and a high speed obtained; whereas in the calculation, the false assumption had been made, that resistance varies as $(S^3 \times D^{\frac{2}{3}})$ and hence conclusions as to excellence either of propeller or ship were illusory.

For many years it was supposed, and we believe the notion yet obtains largely, that the resistance of ships depends chiefly upon the area of the midship section, and this supposition is the basis of the second speed formula to which we have referred. At first sight it appears that the chief work a vessel has to do, is to cut a channel for herself through the water, equal in sectional area to her immersed midship section, and that consequently the work to be done by her engines must largely depend upon that area. The investigations of scientific men during the last twenty years have proved that this is not at all the case, and Mr. Froude's experiments upon models, &c., conducted for the Admiralty, have enabled the different elements of the resistance of ships to be not merely stated, but to have percentage values assigned to them.

Mr. W. H. White in his "Manual of Naval Architecture," thus sums up the elements of the resistance offered by the water to a ship towed or under sail.

"1.—*Frictional resistance* depending upon the area of the immersed surface of a ship, its degree of roughness, its length, and (about) the square of its speed, is not sensibly affected by the forms and proportions of ships; unless there be some unwonted singularity of form or want of fairness. For *moderate* speeds, this element of resistance is by far the most important; for *high* speeds it also occupies an important position—from 50 to 70 per cent. of the whole resistance, probably, in a very large number of classes, when

the bottoms are clean; and a larger percentage when the bottoms become foul.*

"2.—*Eddy-making resistance* is usually small, except in special cases, and amounts to some 8 or 10 per cent. of the frictional resistance. A defective form of stern causes largely increased eddy-making.

"3.—*Wave-making resistance* is the element of the total resistance which is most influenced by the forms and proportions of ships. Its ratio to the frictional resistance, as well as its absolute magnitude, depend upon many circumstances; the most important being the forms and lengths of the entrance and run, in relation to the intended full speed of the ship. For every ship there is a limit of speed, beyond which each small increase in speed is attended by a disproportionate increase in resistance; and this limit is fixed by the lengths of the entrance and run,—the *wave-making features* of a ship."

We are not writing upon the theory of the resistance of ships, and hence it will suffice for our present purpose to say with regard to wave-making resistance, that while a considerable backward pressure upon the bow of the ship is produced by the wave motion she produces in the water, part of this pressure is counterbalanced by the flow of the streams of the water in again towards her stern; there being, strange as it may seem, a forward pressure of water upon her stern, due to this cause. Now, in the case of a screw-steamer, this is altered by the fact that the screw acts upon the streams of the water, whose pressure would otherwise help the ship forward, and this unfavourable action is the greater as the screw is nearer to the vessel. We shall return to this part of the subject farther on.

Mr. Froude's paper, "On the Ratio of Indicated to Effective Horse-Power," was read before the Institution of Naval Architects three years ago, and was to some extent based upon some trials of steamships at the measured mile, by Mr. Denny, of Glasgow. In most trials it has been customary to run the ship at full and at half-boiler power. Mr. Denny tried his vessels at progressive

* This element of resistance is approximately proportional to the cube root of the square of the vessel's displacement.

speeds, and by combining these results with the results of experiments on models made by himself, Mr. Froude was able to separate those elements of the expenditure of force constant at all speeds from those which vary with the speed, and thus finally to arrive at an estimate of the percentage of indicated horse-power effectively used in overcoming resistance, and of losses due to friction and other causes.

Taking the ship under trial at her highest trial-speed, he arrived at the conclusion that only 40 per cent. of the whole indicated horse-power is usefully employed. Our readers must not, however, think that any one looks forward to a saving, either by a new kind of screw or a better-formed ship, of as much as 60 per cent. of the fuel. Much of the loss of power is inevitable, as will appear by Mr. Froude's apportionment of it. He puts down 36 per cent. as an estimate of loss of power due to the machinery itself, a great part being caused by friction, and in this item doubtless we may look for some considerable saving as the result of further improvement in the marine engine. Another cause of loss of power stated by Mr. Froude is the water friction of the screw; this is said to be proportional to the *effective* horse-power, and to be about equal to one-tenth of it. There is further the increased resistance of the ship due to the action of the screw-propeller in removing water from the wake of the ship. Mr. Froude estimated this last item as being equal in amount to 40 to 50 per cent. of what has been called "the ship's natural resistance;" that is the force which would be required to tow her through the water at the same speed. The percentage named is for ships of ordinary form, and with the propeller in its usual condition. This last conclusion is confirmed by other experimentalists. So large an augmentation of resistance, due to the fact of the propeller working in water immediately behind the ship, is not at all surprising when we remember the absolute failure of the screw-propeller when it was at first tried immediately abaft a bulkhead,* where there was a deficient flow of water. By some further experi-

* Details of these trials with illustrations are given in an article on Mr. Wimshurst's labours in connection with the screw-propeller in *Nautical Magazine* for 1872, page 487.

ments with models, Mr. Froude has also ascertained that if a single screw be placed a distance clear of the stern equal to one-third the breadth of the ship, the increased resistance due to it is diminished to one-fifth of that stated above.

While on this point it may be as well to remark upon some devices which have been adopted with a view to placing the propeller in water well clear of the body of the ship. One of these was introduced in the large White Star steamer *Britannic*, and consisted of an arrangement by which the propeller, and with it the after end of the shaft, could be lowered when the vessel got into deep water, so that a part of the area described by it would be wholly below the ship. The plan proved to be a failure on account of the excessive vibrations attendant upon the arrangement. In some of the very fast torpedo boats, in which almost every other consideration is sacrificed to speed, the propeller has been placed abaft the rudder. Such an arrangement would have many obvious disadvantages in sea-going ships.

Some recent experiments on models made by Mr. Griffiths, so well known in connection with the screw-propeller, have confirmed Mr. Froude's conclusions as to the gain which would result from the propeller being placed some distance clear of the stern. The experiments were made upon a model 5 feet long by 10½ inches beam, the propeller being moved by clockwork. On the first trial the propeller was near the stern-post, and on subsequent trials it was shifted aft till at last it was 2½ inches from the post, the resulting improvement in speed being 16 feet per minute on a speed of 50 feet per minute. These figures would of course be of little use as an indication of what would happen in a full-sized ship, but they serve to show that if the propeller could be placed some distance abaft its usual position much loss of power might be obviated.

A further well-known cause of loss of power is due to the slip of the screw. In the paper already referred to, Mr. Froude puts it down as 10 per cent. of the indicated horse-power, and at the meetings of the Institution of Naval Architects last year, he devoted a paper to the consideration of this part of the question, the importance of which has been exemplified by recent Admiralty

steam-trials. *Slip* is, as doubtless most of our readers are aware, due to the fact that the blades of the screw act upon the water in a direction oblique to that in which the ship is being propelled, and thus power is lost in imparting a rotary motion to the water. Hence it has been considered desirable to have screws of small pitch, which act upon the water more nearly in a fore-and-aft direction. The number of revolutions of the engine is limited by other considerations, and consequently the size of the screw has been increased as much as possible where high power was put into vessels. The limit to the size of the propeller is of course the draught of water, and to utilise the power of the engine this limit has been approached as nearly as possible, the pitch being reduced as the propeller was made larger. Mr. Froude points out that it is possible to have a propeller too large, and that a large amount of slip is not necessarily a loss. This he is enabled to do by estimating the value of the surface friction of the propeller, which of course increases with its size. There is a point beyond which a decrease of slip is only obtained by a greater loss of power due to the surface friction of the propeller. Singularly enough, these remarks were strikingly exemplified in the trials of H.M.S. *Iris* during the past year.

The *Iris* is an unarmoured war-vessel built with a view to great speed, and intended to be used as a cruiser or despatch vessel. She is built almost entirely of mild steel, and although her load displacement is only 3,700 tons, she is propelled by engines of over 7,000 indicated horse-power. Her dimensions are: length, 300 feet; breadth, 46 feet; mean load draught, 19 feet 9 inches. The speed expected by her designers was 17½ knots. Comparing these dimensions with large Atlantic passenger steamers of recent types, we find that the *Britannic* has—length, 455 feet; breadth, 45 feet; and the *City of Berlin* has—length, 488 feet; breadth, 44 feet. The former has a speed of 15½ knots, the latter 14¾ knots. The fact that the *Iris*, a foot broader than the *Britannic*, and yet only three-fifths her length, was to be driven at two knots more speed, accounts for the enormous power put into a vessel of her dimensions. When tried, the *Iris* was at a mean draught of a little over 18 feet. The trial consisted of a six hours' run at sea with

full power. With an average indicated horse-power of 7,060, she attained an average speed of 16·4 knots only. This was a great disappointment to the designer, and as, probably, when at her load draught she would lose the fraction of a knot, it appeared likely that her speed would be ultimately a knot and a-half below what was promised, and this moreover in a ship in which so much had been sacrificed for the one object of speed. We quote Mr. Wright's description of the propellers :—

"The original screws of the *Iris* were four-bladed; diameter, 18 feet 6½ inches; mean pitch, as measured, 18 feet 2 inches. The disc area of the blades is about the usual proportion for four-bladed screws, viz., three-tenths of the whole disc. This type of screw has given very good results in the *Himalaya*, where it gave the best results of any she has had during her long career."

A second series of trials was made with two of the blades of each propeller removed, but in this trial the full horse-power of the engines was not developed, it being deemed unadvisable to do so on account of the excessive vibration caused by the use of two blades instead of four. The result was, however, so favourable that further experiments were tried by the introduction of smaller propellers, thus described :—"The reduced diameter is 16 feet 3½ inches, or 2 feet 3 inches less than before, but, as will be seen on comparing the forms of the old and new blades, the effective diameter is reduced in a much larger ratio than the actual diameter.* The mean pitch is 19 feet 11½ inches, or an increase of 1 foot 9½ inches on the No. 1 screws. The disc area of the blades is ·288 of the whole disc. The blades are curved aft a little towards the tips, with a view of keeping the points further away from the brackets supporting the shafts, and of checking in some degree any centrifugal tendency of the water acted on. The blades were polished on both sides to reduce friction, and the edges were made sharp."

* This is owing to the fact that the blades of the first propellers had their greatest breadth at a short distance from the end, whereas the others had it at half the length, and near the end the breadth was only about two-fifths of the extreme breadth.

The result of this trial was "an increase at full speed of two knots, with only 211 indicated horse-power more. The maximum speed was 18·57 knots, or about a knot more than the original estimated speed. The vibration was very moderate considering the large amount of power put through the screws, and the fineness of the stern of the ship. As the full power of the engines could not be exerted on the first screws with two blades, a pair of full strength two-bladed screws, of the well-known Griffiths' shape, were made. The blades were polished on both sides, and the edges made sharp. The diameter is 18 feet $1\frac{1}{2}$ inches, and the mean pitch 21 feet $3\frac{1}{4}$ inches. The disc area of the blades is ·19 of the whole disc. The highest speed given by these screws was 18·587 knots, with 7556 indicated horse-power. The vibration set up in the vessel with these screws was greater at all speeds than with either of the four-blade screws. At the $12\frac{1}{4}$ knots' speed the vibration was very moderate, but it increased up to the $15\frac{3}{4}$ knots' speed, and from this it decreased again until the maximum speed of $18\frac{1}{2}$ knots was reached, when it was nothing unusual."

Mr. Wright then devotes some space to the consideration of the question, whether there was more friction than usual, owing to the fact that the *Iris* has the unusual number of four high and four low pressure cylinders, and thus has a large number of moving parts. Mr. Froude sets down the average loss by friction due to the weight of the moving parts of the engines, or as it is called "dead-load friction," at 13 per cent. of the indicated horse-power. Mr. Wright had a coupling of the shaft disconnected in the *Iris*, and then observed the indicated horse-power necessary to turn the engines at the same number of revolutions as on the speed-trials, and thus found that the power expended on friction was but 8 per cent. of the gross power, an unusually low amount. He then proceeds to discuss the cause of the bad performances of the first screws, *i.e.*, those of the large diameter and fine pitch.

"Authorities on the subject of screw-propulsion teach us that the effective thrust or efficiency of a screw-propeller depends upon the quantity of water acted on in a given time, and the sternward velocity impressed on it, and that it is always preferable to make

the sternward velocity of the current small, by adopting a form of screw which will act upon the largest possible quantities of water. Indeed, it has been said that if it were not for the objectionable element, surface friction, there would theoretically be no objection to an indefinite expansion of blade area. In short, it has been always considered as essential to the efficient performances of screws generally, that their blade area should be large, and that the water must be permitted to flow freely to them. Now, No. 1 screws with four blades appear to fulfil the above conditions very completely; for the blade area is undoubtedly very large, and as the run of the *Iris* is very fine, there is no obstruction to an ample supply of water for the screws. Notwithstanding this, however, the results of the trials appear to show that on account of the large diameter of the screws, the shape, and the large area of the blades, combined with a very fine pitch and consequent high rotary velocity, an extraordinarily large amount of power was absorbed in the surface friction of the blades. In our present state of knowledge it is difficult to determine this with even approximate accuracy, but the elaborate and valuable experiments made by Mr. Froude in 1872, on the friction of planes, with surfaces of various kinds travelling edgeways through water, furnish data which at all events enable us to form an estimate of the friction of screw blades under certain conditions and with certain reasonable assumptions." Mr. Wright comes to the conclusion that surface friction will account for but a small portion of the loss of power, and accounts for the rest of it by supposing, firstly, that the screws of large diameter had an exceptionally bad effect in increasing the vessel's resistance by disturbing the stream line motions; and, secondly, that in the screws of fine pitch, the blades following one another so closely, each injuriously affected the water for the action of that next it. Whatever one may think about this view of the case, there can be no doubt of the justice of Mr. Wright's concluding remarks :—" The great amount of attention which has of late years been given to the designs of ships and engines has, it is feared, for a time prevented such full consideration from being given to the improvement and proper adaptation of the screw-propeller as such an important subject deserves. It is understood

that cases similar to that of the *Iris* have occurred in the Mercantile Marine, and if those who have had experience of any such cases would lay the whole particulars of them before the Institution of Naval Architects, they would help to elucidate a subject on which much has yet to be learned."

It may be that engineers have had their time too much taken up by the consideration of the respective advantages of the mere shape of the screw, whereas at least an equally important object of inquiry is how to adjust pitch, disc area, blade area, and horse-power to each other, and to the form of the ship, so as to get the maximum effect from the power expended. We have remarked upon the fact that the *Iris* has very large horse-power for her tonnage, in order that, although of only a moderate length, she may have exceptionally high speed. Other vessels somewhat similar to her but of lower speed have larger proportional engine power than is usual in the Mercantile Marine, and the same feature is observable in the newer ironclads, but is in their case due to another cause. With increase of length of an ironclad there is increase in area of armour, and it is consequently more economical to propel the vessel by engines of abnormally high power than to fine away the ends of her so that smaller engines would drive her, but at the same time the weight of armour be greatly increased. We thus find that in war ships of all kinds the proportion of horse-power to tonnage is much larger than in the Mercantile Marine. War-ships only steam at full speed occasionally; merchant vessels have to be almost constantly using the full power of their engines, and hence it is important that the elements of the design of ship and engines shall be so balanced as to give a desired result with the least possible expenditure of coal. Now, the experience of late years has shown that war-ships can be propelled most economically by the use of twin-screws, and the question arises, how far our large passenger steamers would benefit by adopting the same arrangement. A valuable paper on this branch of the subject appears in the Transactions of the Institution of Naval Architects for last year, and was contributed by Mr. W. H. White, of the Admiralty. He gave some tabulated results of the trials of a large number of ships in the Royal Navy, in some

cases comparing the experience with single and twin-screws in vessels of nearly similar design and horse-power. The results show that the power is much more usefully expended in the double than in the single screw ships to the extent, on an average, of about 18 per cent. It is then suggested that the twin-screw would be the best form of propeller in the Mercantile Marine, as it has proved to be in the Navy.

Until within the last few years it has been considered that for ordinary sea-going vessels the single screw, on the whole, had a balance of advantages in its favour. Twin-screws have been used in the Mercantile Marine for vessels of exceptional types, when, for instance, the vessel is to be of such light draught that there is not sufficient immersion for a single propeller large enough to utilise the propelling power. In the Royal Navy twin-screws are now used in vessels of deep draught for many reasons, among which one is due to the fact already noticed that all war-vessels have abnormally large horse-power, as compared with merchant vessels. Mr. White anticipates that in the future this disproportion will not be so great as now. He says, on this point, "Looking to the future of steam navigation one thing seems certain, greater speeds will be attained than are now reached. It does not seem probable that any considerable increase in fineness of form, or in the ratio of length to breadth, will be adopted in future ships for the purpose of diminishing their resistance. Any increase in the load-draughts is also clearly inadmissible. The greater engine-powers which will probably be used in the swifter ships will consequently have to be applied on a limited draught of water, and hence it may be anticipated that, at no very distant date, the designs of swift mail steamers will be subject to conditions resembling those sketched above for the *Iris*. The extreme draught will not permit a use of the single screw with a disc area bearing anything like the ordinary ratio to the indicated horse-power; and it will become necessary either to depart from established precedents in the ratio of pitch to diameter of single screws, to adopt twin-screws, or to accept greater speeds of pistons and propellers than are now common in large marine engines. At the present moment there is no great

urgency in deciding between these rival methods, and I have no wish to attempt a prediction as to the practice of the future. The matter is, however, one well deserving the careful consideration of marine engineers and naval architects."

This was written after the unsuccessful trials of the *Iris*, and before the good results were obtained by the second propeller. Mr. White states in his paper that the largest single screw which the *Iris* could use with her designed load draught would be 20 feet in diameter, its disc area consequently being 314 square feet. Now, the combined disc area of the unsuccessful propellers was 537 square feet, and it would almost appear that in penning the remarks we have quoted, he must have had in mind the difference between 314 and 537. We find, however, that the four-bladed propellers with which the *Iris* developed her highest speed had a combined disc area of only 402, which makes the disproportion very much less. We do not conclude from this that the *Iris* is at all likely to do as well with a single as with twin-screws, only that a vessel, in which the ratio of indicated power to load displacement was intermediate between that of the *Iris* and our present fast ocean steamers, would probably be able to carry a single screw of quite sufficient size to use profitably her indicated horse-power. That ocean passenger steamers will ever be as powerfully engined as war-ships we think highly improbable. The latter, as we have already said, are intended merely to be *capable* of high speed, not to steam up to it habitually; the former must get their high speed in the most economical manner, because they want to be always at it. Now, if the weights of engines, &c., of the *Iris* be expressed in percentages of the displacement, they show as follows:—

Hull	38·5
Rigging, armament, stores, and general equipment	13·5
Engines, boilers, &c.	28·
Coals	20·
	100

A passenger steamer crossing the Atlantic at full speed would

certainly require as large a percentage for coals, and her hull would not be very much lighter than that of the *Iris;* if it were put at 6 less we should then have only 20 per cent. of the total displacement to appropriate for rigging, stores, equipment, and *cargo.*

It may be, however, that twin-screws may prove to augment the resistance of the ship less than the single screw, and if there is any marked difference in this respect it will tell very much in their favour. On this special point very little is known at present, and it would be idle to speculate upon it; indeed, nothing but carefully-conducted experiments will determine the question. Other advantages of twin-screws which have been pointed out are their greater handiness, and the security they afford against total disablement of the propellers. On the other hand, it has been urged that the twin-screws are more liable to damage, especially in entering and leaving docks, on account of the propellers projecting so much from the ship. But little sacrifice will be made to ensure greater handiness in merchant ships now that there is such excellent steam-steering machinery, but the guarantee against total disablement afforded by the twin-screw is, we think, a strong argument in favour of the arrangement, cases of damage to propellers being of such great frequency. We would also remark that in the event of accident occurring through the propeller getting adrift, as was the case during the present year with the White Star steamer, *Celtic*, the damage would be merely the loss of the propeller itself. In that vessel the propeller broke the stern-post in two places, but fortunately the rudder was not lost, and she was taken to her destination under sail. We recently saw a very peculiar arrangement of twin-screws in the *Wuhu*, a vessel built for trade on the Chinese rivers. There was an aperture as in a single screw-steamer, and the screws were so arranged as to overlap each other. We presume this arrangement was adopted to reduce the liability of the propeller to be damaged by floating bodies carried down by the stream. It would be of some interest to know how this peculiar arrangement affected the useful expenditure of horse-power.

The paper which obtained the Carlyle Gold Medal at the Institu-

tion of Naval Architects this year, was one by Mr. A. J. Maginnis. In it are given a few facts of practical interest, and the results of some trials of vessels are stated in which small propellers were with advantage substituted for large ones, but on the whole one may very soon come to the conclusion that the Carlyle Gold Medal has not had much direct effect in advancing the theory of the screw-propeller. As to the material and make up of the propeller, Mr. Maginnis discusses at some length the respective advantages of cast-iron and steel, and also of the solid casting as compared with separate blades.

As is pretty well known, numbers of steamers have recently had propellers with separate blades substituted for the old system of one large casting, and it would almost appear that the former arrangement will soon be generally adopted in large vessels. Within the present month we have observed the change made in some of the large Atlantic liners, and the made-up screw will be found to be even of more advantage to steamers in the Australian or South American trades than to those we have referred to. One especially good type of propeller has the faces of the boss recessed, so that the flange of each blade fits in one of the recesses. Further the holes in the flanges of the blades for the bolts which connect them to the boss are so arranged that the nuts do not project, and thus the complete screw shows a round boss and is indeed of the same shape as a propeller cast in one piece. A great advantage of having the blades in separate pieces is the ease with which a broken blade can be replaced, even in a port where there is no dry dock. On this point, Mr. Maginnis remarks :—" Some time ago a large Atlantic steamer, when shifting docks a few days before the date of sailing, fouled the dock wall with her propeller and broke off one of the blades; this accident, though slight in itself, was enough to prevent her sailing, as to have a new propeller she would require to go into dry dock, whereas had it been a movable blade, it could have been replaced when the vessel was afloat, and thus allowed her to sail at the appointed time. Another case was that of a large steamer on the South Pacific coast, which broke her propeller, and was detained some weeks until a caisson to fit the stern was built so as to get at the propeller, as there was

no dry dock large enough to admit her. On the other hand, another steamer with a movable bladed propeller, broke all the blades when within a few days' sail of a Brazilian port, into which she sailed and replaced the blades by lightening the ship aft, the delay being one week, of which only two days were occupied in taking off the old stumps and putting on the spare blades she had on board."

The frequent cases of the breaking of propeller blades appear to be largely traceable to the singular corrosion of the fore part of the blade for some distance from the edge. This reduces the duration of cast-iron blades to about two years and a-half but steel blades have been found to last from three to four years. The most common theory as to the cause of this corrosion is that it is in some way attributable to the vacuum at the back of the blade. Mr. Magginnis thinks "that the great cause of it is the formation of some chemical by the mixing of the atmosphere and salt water which attacks the iron; this mixing is caused by the descending blades of the propeller, &c." Perhaps some of our readers may have made the acquaintance of this very active compound which the writer of the paper somewhat vaguely designates as a *chemical*, apparently thinking that he thereby assigns a reason for its activity. Propellers for the Royal Navy are usually castings of gun-metal and of course are exceedingly durable, the only difficulty in their case being to prevent galvanic action between the propeller and the shaft tube, or the nearest iron in the structure of the ship. Many war-vessels are sheathed with wood and metalled; in their case of course there is no trouble, in other vessels we believe the difficulty has been got over by attaching zinc plates to the iron which is near the gun-metal, thus whatever galvanic action takes place is at the expense of the zinc, and the iron is safe till all the zinc is gone.

Mr. Maginnis gives some interesting particulars showing the frequency of damage to propellers as follows:—"In 1873, the *Celtic* fouled some floating wreckage off the south coast of Ireland and lost the entire propeller. In 1874, the *Scythia* struck a large whale and broke off three blades. In 1877, the *City of Berlin* became disabled by the keys in the propeller boss having fractured the boss to their own depth, or in other words turned out the metal. Another peculiar disablement occurred to the *City of*

Chester in 1878; the propeller broke through the boss, losing two of the blades, but the fracture not being large enough at the after end to clear the shaft's diameter, it hung in its place till the vessel arrived in port. Throughout the year 1878 there were upwards of 33 cases of disabled propellers reported in one of the Liverpool daily (not shipping) papers, and no doubt this would be but a fraction of the whole number." In conclusion, Mr. Maginnis, after giving some recommendations as to pitch, &c., says:—"From the strange results which have of late been obtained from propellers and which have overthrown the long recognised rules and theories, it seems to the writer that on this subject no stated rules can apply, as almost every steamer requires a certain propeller, which unfortunately only well-watched trials will show or reveal." True it is that no recognised rules do apply, but we confidently hope that patient investigation and experiment will ultimately enable us to find rules which will apply. To this end one important step has been taken, when the falsehood of false rules is found out and exposed.

THE CASE OF THE "BALMORAL" PASSENGER STEAMER.

IT is somewhat singular that the first Court of Survey under the Merchant Shipping Act of 1876 has been held to decide a case nothing whatever to do with the principal purpose of that Act, but connected with the giving of certificates to passenger steamers. The action of Board of Trade surveyors under the Unseaworthy Ships' Clauses of the Act of 1876 has been so far not appealed against in any one case, and the consideration that about four hundred ships have been detained as unseaworthy since October 1st, 1876, gives additional force to the following remark of the Wreck Commissioner on this subject:—"I think it speaks well for the way in which the surveyors of the Board of Trade have discharged their duties, for had those duties been generally exercised in an arbitrary and vexatious

manner there can be little doubt that we should have had a number of these appeals." The legislation with regard to passenger steamers dates as far back as 1854, but the right of appeal to a Court of Survey in the event of a surveyor refusing a certificate depends upon clause 14 of the Merchant Shipping Act of 1876.

The *Balmoral* is an iron paddle-steamer of 126 tons gross, and was built on the Clyde in 1842. She has had for some years past passenger certificates, one called a No. 4 certificate, entitling the vessel to carry 331 passengers in summer or 236 in winter some distance down the Firth of Clyde, the other called a No. 5, entitling her to carry 616 passengers, but not so far down the Firth, in fact only as far as to the Island of Bute. In the autumn of last year, Mr. Wimshurst, the principal surveyor for iron ships to the Board of Trade, made an inspection of the vessel, and reported her condition to the Board of Trade, with the result that the Board directed that a special survey should be held on her before the granting of another certificate. In the spring of this year when the vessel was to be brought forward for her usual employment, the owner applied for a certificate, and Mr. J. Fielden, one of the Board's surveyors at Glasgow who had surveyed the vessel and granted declarations as to her fitness to carry passengers in 1874, 1877 and 1878, visited her in compliance with the application and prescribed certain repairs, but a further special survey was held by Mr. Wimshurst, Captain Pryce, the principal officer at Glasgow, and Mr. Fielden, and on the report the Board of Trade decided not to grant a certificate. The conclusion of the report states that, "the condition of the vessel is so thoroughly unsatisfactory that I am only able to recommend the Board not to issue another certificate to her, and further I beg to advise that requirements to bring her to a satisfactory condition would be quite outside all reasonable limits." The vessel at the time of this survey was "on the patent slip, the bottom painted, and a considerable portion of the cabin floor, ceilings, &c., removed." The report we notice does not say that any of the cement had been removed from the plates, and we may therefore take it for granted that this had not been done.

The owner of the vessel appealed from the Board's decision to a

Court of Survey, which on this occasion was constituted by Mr. H. C. Rothery, Wreck Commissioner for the United Kingdom, assisted by Mr. J. R. Ravenhill, C.E., and Mr. Robert Duncan (shipowner and shipbuilder of Glasgow), professional assessors. Mr. Wimshurst's opinion was further supported before the Court by two practical surveyors of large experience in the survey of passenger steamers, Mr. R. Murray and Mr. L. Mills, both at present Principal Officers to the Board of Trade. On the other hand, Mr. Fielden and a number of other witnesses, practical shipbuilders and foremen at various shipbuilding yards on the Clyde, were of opinion that the vessel would, with slight repairs, be fit for her work.

The allegations made against the vessel were thus stated in the Report of Survey :—

"Our attention was first given to the examination of the outside; one of the shell plates had been replaced with new, and some few other were covered with patches or doubling plates; the arrangements of these at their butts are interesting, and under one of the paddle-beams they are sufficiently so to sketch; the flat of the bottom is out of line, the garboard strake on the starboard side within a length of 38 feet amidships has nine patches on it, while on the opposite side of the ship there are 12 patches within the same length; inside the vessel the frames in the fore-peak are wasted to the condition I before stated them to be in; the fore-peak bulkhead, however, is good, it being about two years old; in the compartment abaft this shows simply waste (not excessive) due to age. In the fore-cabin we saw the inside of one of the patch plates, it is situated on the side, and just in front of the starboard paddle-beam, the first of the sponson stays had broken through the old plate; these holes are now protected from water by the patch. A similar doubling exists upon the sheer strake, the butts of it come up to the paddle-beam, and are over the butts of the patch plate on the side; the termination of the stringer is at the same vertical line, beside which the stiffening frame to take the paddle-beam is wasted almost away. In the engine-room the deck stringer is so badly connected at its butt as to be worth comparatively nothing, it is not attached to the sheer strake; the

plates and frames are in such condition as might be expected by age, and several of them patched. There are no bilge keelsons, and a flat plate, 11 in. × $\frac{3}{8}$ in. upon the floors is all she has in the place of a main keelson, yet the vessel at this place has to carry a boiler 12 ft. × 12 ft. with all its attachments. In the after-cabin nothing was noted, and in the ladies' cabin two patches were being fitted to cover holes."

We might summarize all this thus:—Plates wasted very thin in places; repairs to skin were mostly badly arranged patches; frames in places wasted; all but total deficiency of proper stringers and keelsons.

The Court themselves surveyed the vessel and gave a lengthy judgment in detail, making orders as follows:—

"(1.) That all the vessel's plates which are reduced to $\frac{2}{16}$ths of an inch, should be renewed.

"(2.) That the patches along the garboard strake should be removed, and a narrow garboard strake put on and securely rivetted to the keel and garboard strake, similar to that which we now find on the fore part of the vessel.

"(3.) That the corroded frames, where either flange is gone, should be either doubled or replaced, and all floor-plates overhauled, and where necessary made good.

"(4.) That the centre vertical plate bearer under the boiler should be prolonged, as far as it can be, between the engine and and boiler bulkheads, and bilge or sister keelsons, introduced under the sides of the boiler, and carried from bulkhead to bulkhead, and be attached to the skin of the ship by intercostal angle irons, and with a continuous angle iron running fore and aft along the top of the floor plates, and rivetted to the keelson plates and reverse bars, thus distributing the weight of the engine and boiler over a greater number of the floor plates, and at the same time giving additional strength to the bottom.

"(5.) That the vertical bracket plates in the wake of the paddle-boxes and under the paddle-beams which are found decayed, should be renewed.

"On these repairs and alterations being effected we think that the vessel may properly receive a No. 5 certificate."

As regards the plates the Court appear thus to have laid down the dictum that it is in the case of river passenger steamers only necessary to remove plates when it can be proved that their thickness is as little as an eighth of an inch. It is true the original thickness of the *Balmoral's* plates was only a quarter of an inch, but it must be remembered that the resistance offered to penetration varies as the square of the thickness, and thus one-half the original thickness practically means one-fourth the original efficiency in that respect. It must also be considered that it would be very difficult to ascertain for certain that no plate was less than the prescribed thickness; this certainly could not be done unless the whole of the cement were removed, and we see no indication of any further opening-out of the vessel in the reported judgment of the Court. Further, it must be remembered that there were a number of patches, and a patch would itself be the cause of special weakness round the line of its connection with the plate.

As regards the wasting of frames and floor plates, the Court say in their order that the corroded frames where either flange is gone, should be doubled or replaced. This would appear to limit the doubling to cases where the flange was actually gone, and it would obviously be a very inadequate measure to secure the desirable local and transverse strength of the vessel, but in their detailed judgment, they appear to extend the remedy to the case of "frames very much eaten away," which, if rather vague, is certainly a somewhat better provision for the needs of the case.

Passing over the less important questions of local detail, we come to the consideration of the general strength of the ship, and on this point, after a careful perusal of the evidence as reported, we incline to the opinion that the Court have to some extent misapprehended the charge made against the vessel, as well as the grounds upon which it was made.

Mr. Wimshurst certainly mentions the fact that the vessel's bottom was out of shape, but his report does not appear to us to indicate that he attached any great importance to that feature of the case. From his merely mentioning the fact, the Court appear to have been led to concentrate their enquiries as to strength

upon this one point, and have been at great pains to set forth their reasons for believing the indentation to be unassociated with any weakness at that place. At the same time, singularly enough, they limit their remedies for deficient strength to that very part of the vessel, and propose to strengthen the boiler bearers and continue them merely to the bulkheads abaft the boilers, and forward as far as the engines will permit, except that at the sides some of the work would extend to the bulkhead at the fore side of the engine-room. They think that "the vessel is on the whole a strongly constructed vessel, due in great part to her exceeding depth in proportion to her length, and that there is no appearance of straining or weakness in any part of her." Of the deterioration in strength due to the extensive patching and the bad arrangements of the butts of doubling plates, &c., nothing is said except as regards the garboard strake which they propose to double. Considerable importance appears to be attached to there being no signs of straining; this is twice referred to.

At the conclusion of the judgment, the Wreck Commissioner referred to the evidence of Mr. J. Fielden as having struck the Court with great surprise, he having stated that he thought it right to grant certificates to vessels of a "possibly threatening character," and until he was "satisfied that the vessel is dangerous or threatening to be so in a short time;" and again he says, "I could not refuse a certificate unless I felt sure that the ship was dangerous." The Court, as might be expected, recommended Mr. Fielden in future to draw the line before getting to vessels having a possibly threatening aspect. The Instructions to Surveyors of Passenger Steamers, we need hardly say indicate a very much larger margin of safety that Mr. Fielden appears to think necessary. It is true that very few details are set forth as to the survey of the hulls of ships, but most minute directions as to details are given with regard to the boilers and engines, descending even to particulars of the engine-room tools, such as files and hammers, and from this one may surely infer the greater from the less; that the Board of Trade desire that their certificate shall indicate that in every particular the vessel to which it is granted shall not only be thoroughly efficient, but shall have

a large margin of safety. We cannot but think of the awful sacrifice of life entailed by the sinking of one of these river passenger steamers, the large numbers of passengers rendering nearly useless all possible provision of life-saving apparatus, and in the face of these considerations we think a very large margin of safety is necessary. A boiler for a passenger steamer is to be capable of bearing many times the pressure allowed to be put upon it, and yet we have it now on authority that a vessel is presumably safe if her hull shows no signs of weakness, the fact being that when iron ships do show signs of weakness it is nearly all over with them. In the case we are considering, the vessel ordinarily steams in smooth water, and is exposed to very slight strains, and may go a large number of trips without having her strength so much tried as to develope visible indications of weakness. Occasionally, however, it may happen that she will get in rougher water than usual, and the structure, which *appeared* from the point of view we are considering, strong enough, gives way suddenly, and a great catastrophe is the result. Whether the estimate of the required strength of the vessel be based upon practical experience or upon mathematical calculation, we think that a Government certificate should guarantee for the hull equally with the boiler a large factor of safety, and that the margin in either case should be very much above what would be determined by waiting for indications of straining.

In a recent article in this magazine,* we discussed the practicability and advisability of making river steamers unsinkable by means of watertight bulkheads; if this were done, we should not be very particular as to the minimum thickness of plates, provided the vessel had a proper margin of general strength. In the absence of such bulkheads we strongly deprecate the notion that plates whose *presumed* minimum thickness exceeds one-eighth of an inch, are quite the thing for vessels which are exposed to such risks as are river passenger steamers. The effects of collision would certainly not be provided for by any practicable thickness, but we certainly ought to have vessels capable of surviving a mere bump, or a

* *Nautical Magazine*, March, 1879.

ramming blow from a floating spar. Bare seaworthiness is sufficient to ensure a vessel against detention by the Board of Trade on the grounds of serious danger to the lives of her crew; surely there should be a great step from that to the degree of efficiency which would justify a Government Department in certifying a vessel as fit to carry hundreds of helpless passengers.

COAL CARGOES (SPONTANEOUS COMBUSTION, &c.)

(COMMUNICATED.)

A MOST important and valuable, because highly suggestive, return has recently been prepared by the Board of Trade pursuant to an order of the House of Commons on the motion of Mr. Childers.

It furnishes a succinct account of recorded cases of spontaneous combustion and explosion on board ships carrying coal, as cargo, or for ship's use, and also a list of coal-laden ships reported as missing between the Report of the Royal Commission on the subject, dated 18th July, 1876, and the 14th August, 1878. This catalogue of calamities at sea is painfully interesting, covering a period of only two years, during which the number of coal-carrying ships, which have suffered from spontaneous combustion, is 41; and from explosions, 24; whilst the number of coal-laden ships which have perished at sea, causes unknown and, therefore, conjectural, is no less than 52, giving a total of 117, or an average of 5 per month.

The register tonnage of the 52 missing ships, that have so mysteriously disappeared, amounts to 20,927 tons, and their cargoes, taken at their actual carrying capacity, about 30,000 tons, the value of which, including the ships, doubtless gone to the bottom of the sea, with no human eye to witness the catastrophe, except the unfortunate crews and passengers, may be fairly estimated at £300,000. Beyond all this is the fact that the lives thus sacrificed are given (crews and passengers all told) as 463.

Neither the tonnage of the other 65 ships, nor the loss of life caused by total destruction or partial injury are given, by which to estimate the serious extent of damage sustained, or the misery endured by the unfortunate crews.

By this terrible catalogue of marine disasters, imperfect as it needs must be, the fact is forced upon the mind of the most incredulous reader that coal is a very dangerous cargo, and, as will presently be shown, that which is most in request (the best steam-coal), is the most dangerous, and the longer the voyage the greater the peril.

Several important questions naturally present themselves:—

1. To what is the danger chiefly attributable?
2. Why augmented by the length of the voyage?
3. What precautions have been suggested by way of remedy?
4. If not efficient, why? 5. What other remedy can be found?

First then as to the cause of danger. The very many investigations and inquiries, practical and scientific, which have been instituted, have resulted in an almost universal consensus of opinion, that explosions in coal-laden ships arise from the ignition of volatile and highly inflammable gases evolved by the disintegration of coal in confined or ill-ventilated places. The innumerable cells which characterise the structure of coal, are replete with those gases, the chief of which is carburetted hydrogen. Of so inodorous a character is this gas, that its presence cannot be detected by the sense of smell. It explodes instantaneously on the approach of a naked light. Of course the larger the volume of gas, the more dangerous the explosion. As these gases are liberated by every fracture of the coal, the breakage which ensues from the discharge of the coal into the hold of the ship, and from the process of trimming when there, and the continual trituration to which the fragments are subjected by the motion of the ship, when pursuing her voyage, are so many means of disengaging the perilous gases, and of exposing the ship to imminent danger. So subtle are these gases that they make their way through the smallest crevices, or openings between the timbers, and if, perchance, a sailor thoughtlessly strikes a lucifer match against the bulkhead, or partition of the hold in which coal is stored, the

chances are that instantaneous explosion, and probably serious, if not fatal mischief, may ensue.

Spontaneous combustion arises from a different cause. It is generally admitted to be due to the presence in the coal-dust, of iron pyrites operated upon by moisture, with a sufficient quantity of atmospheric air to oxydise the pyrites, convert the sulphur into sulphuric acid, which combines with the iron, whilst hydro-sulphuret of hydrogen is given off, ignition of the gases ensues, and the coal takes fire; but to sustain this combustion oxygen is essential, it is therefore obvious that ventilation, instead of preventing the mischief, might aggravate, if not prove to be the immediate cause of it. In a recent Inquiry (*Richmond*, s.s.), it was stated by the Wreck Commissioner that the deleterious gas thus given off when "mixed in the proportion of one part to from six to sixteen parts of atmospheric air" (a wide latitude of proportion) "becomes a highly explosive compound, the force being greatest when mixed with ten to twelve parts of atmospheric air."

Secondly: As explosion and spontaneous combustion are usually the work of time, and proceed so obscurely as to escape observation until the mischief is done—the former often depending on the quantity of gas evolved by the friction against each other of the surfaces of the coal—it may frequently happen, particularly if the weather be favourable to smooth sailing, that during a short voyage the liberation of the explosive gases may not reach the danger point, whilst the chances of ignition by contact with naked lights, &c., are less in proportion to the shortness of the voyage, and time may not suffice by the slow process of smouldering heat for the development of the exciting causes of spontaneous combustion. The reverse of all this must therefore be expected in protracted voyages into tropical climates. The present return shows, that the greater number of voyages with coal on board are to tropical destinations, and as from the time the coal-laden ship leaves these shores, the exciting causes, trituration and heat, are continually augmenting the danger from the time the coal-laden ship quits these shores until the mischief ensues, it is not surprising that so large a number of these calamities should have overtaken vessels bound for warm and distant climates. The precautionary

measure that has found most favour with the Royal Commission, with the Committee of Lloyd's, and other underwriters' associations, &c., is that of ventilation. Surface ventilation is especially recommended by the Royal Commission, after careful examination of a considerable number of witnesses supposed to be most conversant with the subject. The minds of those who have been appointed by the Board of Trade to hold inquiries into the causes of casualties at sea, appear also to have been strongly imbued with the impression that ventilation is the most effectual safeguard against such disasters.

It might therefore reasonably have been expected that the return called for by Mr. Childers would probably have afforded very conclusive evidence of the accuracy of that theory, the particulars of the "ventilation in each" having been specially called for.

On reference, however, to the Report, it will be observed, under the first head "Spontaneous Combustion in Cargoes," that of the 16 cases of total loss and abandonment, 10 were ventilated; of the 19 ships which only sustained partial injury or escaped damage, 6 only were ventilated.

Under the second head, "Explosion in Coal Cargoes," the damage being only partial, in 11 out of the 21 cases there was no ventilation.

Under the third head, "Spontaneous Combustion in Coal for Ships' Use," the damage only being partial, there was in 3 cases out of the 6 no ventilation.

Under the fourth head, "Explosions of Gas in Coal for Ships' Use," the damage being only partial, there was in 2 cases out of 3 no ventilation.

The total result of the above four classes is, that of the 65 ships, the subject of spontaneous combustion and explosion, 42, or nearly two-thirds were ventilated, and in the majority of cases of total loss and abandonment ventilation existed.

It may be that the ventilation in many of these cases was imperfect, otherwise, unless there are other countervailing circumstances to be taken into account, it might be inferred that ventilation is rather conducive to than preventive of disaster. Indeed,

the worst of these cases fall under the head of spontaneous combustion, with reference to which it is questionable whether the creation of draught or the admission of air in any shape would not tend to encourage the smouldering heat and fan the flame when developed in the hold of the ship. Evidence of this principle is furnished by daily experience of the domestic hearth. Outbreaks of fire are most effectually subdued by the exclusion of air. If it be admitted that ventilation properly applied may be the means of averting the danger of explosion, it must at the same time be admitted that it may facilitate spontaneous combustion.

The desideratum, therefore, is some remedy which, whilst calculated to avert one species of danger, will not tend to create another.

The only fact in which all authorities appear to agree, is that the primary cause of all the mischief attendant upon the carriage of coals by sea, is to be found in the coal itself. It therefore behoves those who are interested in the preservation of life and property at sea to strike at the root of the evil, by resorting to any available means of divesting the coal of its dangerous properties, qualifying it to resist their influence.

The return which has given rise to these observations pretty clearly demonstrates that ventilation furnishes no reliable safeguard against such calamities, whilst in some cases its tendency is to accelerate the outbreak of the slumbering elements of danger.

It has already been shown that the source of danger by *explosion*, is the liberation of the volatile gases which exist in the cellular structure of the coal, and that *spontaneous combustion* is the result of chemical agencies acting upon the latent sources of danger inherent in the coal. Divested of these the coal becomes perfectly harmless, but it would appear that this can only be effectually accomplished by breaking down the cells of the coal, in fact, reducing it to dust to eliminate the detrimental gases, and then reconsolidating it by such processes as competent manufacturers of what is called patent fuel use for utilising by agglomeration the small coal or slack produced in winning the large coal from the mines. It may be supposed that the liberation of these explosive gases is seriously detrimental to the coal, but this impression is

erroneous. These evanescent gases, merely flashing out on ignition as the coal comes in contact with the fire, give out little or no sustaining heat, and for the loss of this the coal derives more than adequate compensation from the agglomerating material used in its reconsolidation. In fact it has been found that fuel made by approved processes is superior in many respects to the large coal from the same mine.

Indeed, in some cases a given quantity of fuel made from South Wales steam coal has proved, on careful trial, to be nearly equal to double the quantity of north country steam coal.*

This superiority in quality is, however, only attainable by the employment of superior machinery and expensive agglomerating ingredients, but so long as it does not outstrip the price of coal, nay, even if it did, mere pecuniary considerations ought not to militate against its use where so much is at stake. Shipowners, on whom rests the grave responsibility of caring for the safety of the lives and property of passengers, crews and consignees committed to their charge, are without excuse if they reject the best safeguards against conflagration at sea.

Undoubtedly there has been a strong prejudice against the use of patent fuel in lieu of coal. It requires a different treatment in

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* Mr. Thomas Hales and Mr. W. Stone, the Superintendent and the Engineer of the South Metropolitan School, Sutton, Surrey, reported on Patent Fuel, in December, 1876, as follows :—

"We have had it in use for some weeks, and after a very careful test the following is the result of two weeks' work :—

		Tons	Cwts.
"1st week,	North Country steam coal	5	16
"2nd „	Metropolitan patent fuel	3	0

"In addition to this saving in weight and cost of fuel the following additional advantages would still further reduce the outlay :—

"1. The ash is reduced to a minimum.

"2. The smoke, often a great nuisance, in spite of patent doors, &c., is very considerably lessened.

"3. As the 'patent fuel' requires little or no stoking there is a saving of quite 50 per cent. in the labour."

The best proof of the sincerity and soundness of this report is that the Sutton School has continued to use this fuel ever since.

the furnace, and engineers and stokers, like many others, are averse to the adoption of things to which they are unaccustomed.*

If the Committee of Lloyd's were to adopt a differential rate of insurance on coal and patent fuel in favour of the latter, or, at all events, against those descriptions of coal which are known to be intrinsically dangerous, patent fuel would soon come into more general use. Shipowners would rejoice in their greater immunity from loss and in the advantage of saving space by increased facility for stowage; engineers and stokers would, from economy in labour and greater cleanliness, become as much enamoured of it as they were before opposed to it, and the insurance societies would find their account in the diminution of demands on their financial resources.

By substituting patent fuel for coal the expense and trouble of all those doubtful expedients against explosion and spontaneous combustion by ventilation, &c., would be dispensed with, and coal-owners would be amongst the first to advocate the resort to patent fuel as the most profitable course for themselves even if they have to crush the large coal for the purpose. This may seem problematical, but it is not the less true because, as previously observed, the best steam fuel is found to be the most dangerous from its brittle or friable character.

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* Patent or artificial fuel had its origin in an economical design to utilise, at small expense, the waste slack, hundreds of thousands of tons of which lie on the pit banks or are left in the mines as not worth the cost of bringing to the surface. Thus the main object or endeavour of the artificial fuel-maker was to employ the cheapest available material for agglomeration. As a natural consequence, inferiority was the characteristic of the fuel produced, and it found so little favour with consumers that it became necessary, in order to successful competition with coal, to select clean small coal of good quality and to employ materials for its consolidation calculated to add vitality to the burning properties of the coal without producing ash or clinker. Thus fuel-making has become a scientific process, which varies, as regards the use of materials, according to the nature of the coal, the use to which the fuel is to be applied, and the climate or distance of its destination. It may be made to travel without disintegration or damage, to places where the best of steam coal would on arrival be little better than dust, to avoid which it has been found expedient to crush and reconsolidate the lump coal to render it available for long voyages, and hence prejudice is disappearing with every day's experience.

The action that has been taken on the suggestion of the Royal Commission by the Board of Trade and Custom House authorities, by which the latter require on the entry outwards particulars of the coal shipped, of course points to some future remedial measures.

When a coal-laden ship becomes the victim of a fire at sea, the record kept by the Customs will tell from what mine or locality the coal on board was obtained; and as the Merchant Shipping and other Acts abound with provisions for the safety of life and property at sea, it requires no very great penetration to foresee that legislation will not, if the catalogue of disaster demands a remedy, stop short of prohibiting ships, passenger ships at least, from proceeding to sea with coal on board known to be "intrinsically dangerous."

The unrivalled superiority however of the Cardiff, Glyncorrwg, and other South Wales coals as powerful generators of steam is so generally admitted, that their use, despite the risk, is deemed almost indispensable. It would be no great hardship to interdict their use, unless divested of their dangerous properties, because, so treated, their value for a certain class of vessels, and for various localities, foreign and colonial, would be almost incalculable, and when, as is almost sure to be the case, patent fuel, on account of its freedom from all liability to spontaneous combustion and explosion, its cleanliness, freedom from smoke, close stowage, and other peculiar advantages, comes to be preferred to all other fuel, it will pay the coal-owner to convert his large coal into fuel for maritime purposes.

It must not be supposed that the north country and other excellent steam coals do not possess, although, perhaps, in a less degree, the dangerous properties of the South Wales steam coal. The enquiry of the Wreck Commissioner into the loss by fire of the British barque *Amadine*, furnishes incontestible evidence of this, as 300 tons of her cargo consisted of West Hartley steam coal, to the spontaneous combustion of which the loss of the ship was attributed.

The fact of patent fuel having found favour with the Admiralty for the use of the Navy, goes far to recommend its more general

adoption. But the main object of the present argument is to show that whilst, as it is obvious that ventilation furnishes no adequate safeguard against the danger of spontaneous combustion and explosion, there is at least one available remedy which commends itself to all persons interested in this important question, and it curiously happens that whilst concluding these observations, intelligence comes to hand of the terrible steamship explosion of the *Buteshire*, a fine iron screw-steamer of 871 tons register, which cleared out from Cardiff on Saturday, the 12th April, with 1,700 tons of slack on board. The explosion occurred within a few hours after clearance from the dock, and yet is reported to be due to an accumulation of coal-gas, although the hatches were off and the ventilation otherwise in good order; and no lights could have been taken into the hold, as the whole of the men were on duty on deck at the time, and the master, who was killed by the explosion, was seated in his cabin.

If this be true, the theory of safety in ventilation receives another rude shock, and in the absence of a better remedy the adoption of the patent fuel system commends itself to the serious consideration of the shipping community, whose confidence in the safety it insures cannot fail to be materially strengthened by the fact that, notwithstanding the many thousands of tons of patent fuel annually shipped from these shores, there is not a single instance on record of any catastrophe having arisen either from explosion or spontaneous combustion of patent fuel.

THE SWEDISH ARCTIC EXPEDITION BY THE WAY OF THE NORTH-EAST PASSAGE.

(*Concluded from Page* 406.)

IT remains to give a brief summary of the cruise, so far as is yet known, from the letters of Professor Nordenskiöld.

The little squadron weighed anchor on the 1st of August, bound across the Kara sea, which was found free from ice; and as regular sounding and dredging had to be carried on here,

some of the party went forward in the *Lena* for the purpose of examining the strait between Yalmal peninsula and Bieloi (White) island. No ice was seen by the *Vega* until this island was approached, and then it was so rotten as to cause less impediment than did the thick fog. Eastward of Bieloi island the ice disappeared, and on the 6th, the *Vega*, *Fraser*, and *Empress* were safely at anchor in Dickson harbour, situated between an island and the main at the entrance to the Yenisei. A chart of the harbour was made, while the naturalists explored the surrounding country. Vegetation was found to be abundant, and reindeer grazed on the grassy plains.

The *Lena* having arrived, and the *Fraser* and *Empress* having departed for the Yenisei, by the morning of the 10th the *Vega* and the *Lena* were ready to resume the voyage, shaping their course first for the westernmost of the Kammenni islands, which front the gulf at the mouth of the Pyasina river. The weather was alternately thick and fine, while the ice was generally rotten and melting; but progress was slow when the fog became dense, for the course lay among a perfect labyrinth of islands, large and small, which appear to fringe the coast the entire distance between Dickson harbour and cape Chelyuskin. Occasionally they were compelled to lay to, owing to the number of islets and the density of the fog. The islands are not laid down on the chart, nor is the coast-line properly delineated, as it was found to extend much further seaward than represented. Sounding and dredging were never omitted, and a rich harvest was made from the sea-bottom. The Professor incidentally mentions the finding of some curious and beautiful crystals on an ice floe; they appeared unlike any ordinary terrestrial mineral, and he seemed to think they were formed from sea-water during the severe cold of winter.

From the 14th to the 18th of August the vessels were at anchor in an excellent harbour, situated in the strait between Taimyr island and the main. It was named Actinia harbour, from the number of sea anemone brought up by the dredge. The land was devoid of snow, and richly covered with moss and lichen, but though the pasturage was superior to that in the valleys of Spitzbergen, where reindeer are plentiful, these animals were here

found to be both scarce and shy, owing probably to the presence of wolves, for Russian fishers and hunters have not visited the locality for an age. A close examination of the strait between Taimyr island and the continent was made in the steam launch. It was found to be very shallow and muddy, and unfit for the passage of the *Vega* into Taimyr gulf, a strong current setting to westward. Actinia harbour, which is well sheltered, and has good anchorage, is recommended as a northern station for meteorological observations.

The rounding of the north extremity of Asia is narrated by Professor Nordenskiöld as follows :—

"Despite the fog, which still lingered, the *Vega* and *Lena* weighed anchor on the 18th, bound on a course towards cape Chelyuskin. The experience that we subsequently gained of the temperature in these regions showed that we did right ; otherwise we might have waited for clear weather until the sea was covered anew with ice. We steamed along the western coast of Taimyr island, where we found numerous small islets, which are not laid down on the chart. It is even possible that the island itself may be cut through by several channels. Moreover, the northern end of the island is not so far north as represented. We only encountered ice in small patches, and generally rotten; none sufficiently solid to bear the weight of two men. The gulf of Taimyr was almost free from ice, and what there was appeared to be slightly disturbed by the swell as we traversed the entrance.

"On the 19th, by the aid of steam and sail, we continued our route along the coast of the Chelyuskin peninsula, always surrounded by an extremely dense fog except in the direction of the land, where, by its occasional lifting, we were able to distinguish the contour of the coast-line. In the course of the day we steamed towards a large field of unbroken ice which projected from a bay on the west coast of the peninsula : in the fog, and seen in the distance, it appeared, owing to the refraction, to be high and thick, but when we approached nearer it turned out to be as rotten as any we had yet encountered. The fog still continued to obstruct our view, and I had already begun to fear that the northernmost point of Asia might be so thickly enveloped in it that we should be

unable to approach and examine the cape, but soon an ice-free promontory appeared to jut out towards the N.E.-ward; a small bay, open to the northward, and also ice-free, penetrated the land for a short distance. There, on the 19th of August, at 6 p.m., we cast anchor, hoisted the ensign, and, with one of the small guns on board the *Vega*, saluted; we had accomplished the first object of our voyage, and reached the most northern point of the Old World.

"The weather had cleared up, and the cape lay before us, glorious in sunshine and divested of snow. As on our arrival at the Yenisei in 1875, so now, we were accosted by a fine white bear. Before we had cast anchor we saw it trotting up and down the shore, now looking on, and now sniffing in the direction of the bay, apparently for the purpose of ascertaining what importunate guests approached a region where bears had hitherto exercised undisputed sovereignty; affrighted, however, at the noise of our cannon, it soon took to flight, and thus escaped the guns of our hunters.

"We remained here until noon of the next day to determine the geographical position of such an important point, and to allow our zoologists and botanists the opportunity of examining the neighbourhood.

"Cape Chelyuskin is a low promontory, terminating in two points, which are separated by the bay in which we cast anchor. High land, with a gentle slope, runs parallel with the eastern shore, and stretches southward. From our astronomical observations, and a rapid triangulation, we made the westernmost point to be in—

Lat. 77° 36′ 37″ N., Long. 103° 25′ 30″ E.,

and the easternmost point, which extends a little further north, we found to be in—

Lat. 77° 41′ N., Long. 104° 1′ E.

"Inland the hills appear to gradually rise to the height of 1000 feet. There was scarcely any snow on the high land of which I have spoken, nor on the level. Here and there only might be seen large patches of snow on the rugged flanks of the hills, or in their deep and narrow gorges. Along the shore, however, there was still a foot of ice all round.

"The soil of the plain is clay, split into six-sided figures, more

or less regular, generally bare, but here and there covered with verdure, mostly grass, moss, or lichen, such as we had seen at the spots previously visited. There was no granite; but we found vertical beds of slate, which yielded no fossils, and abounded in pyrites. At the outer point of the promontory the slate beds were traversed by thick veins of quartz.

"Doctors Kjellman and Almgrist could only find twenty-four species of phanerogamous plants, which were mostly remarkable for forming in hemispherical tufts. There was equal uniformity among the lichens, though there was plenty of them. It seemed as if the vegetation of the Chelyuskin peninsula, in pushing northward, had been suddenly arrested by the sea at the extreme points, and had there developed in quantity what it lacked in variety. Every plant of the district was collected within a limited area, so that no new discovery could be made by searching beyond. Animal life on the land rivalled the poverty of the vegetable world. Among birds, sandpipers were alone numerous; there were a few species of *tringa*, a diver, a large flock of barnacle geese, a few eider ducks, and traces of an owl. At sea we saw a single walrus, two white whales, and a small seal, so that warm-blooded animals appeared to be scarce. The dredge brought up many kinds of algæ and many of the lower forms of life, some common to the Baltic and the large Swedish lakes, tending to prove that the waters here formed part of the glacial sea in the glacial epoch."

Anchor was weighed towards mid-day of the 20th, in a sea so free from ice that it was hoped the same might continue until the westernmost point of the New Siberia islands was reached. During that and the following day, however, they steamed among ice, which, though partially rotten, was still abundant, and at last got to be so thick that they were brought up by it; added to which the navigation became more perilous owing to the dense fog. The easterly course hitherto shaped was changed to a more southerly one, and at mid-day of the 22nd they lay alongside an ice floe, waiting for clearer weather. The dawn of the 23rd was brighter, and the way had to be threaded through a labyrinth of ice, of which they were not clear until 5.30 p.m. of that day, having lost four-and-twenty hours. The depth, which among the ice had

been 33 to 35 fathoms, began to gradually decrease as they approached the coast, which was sighted at 8.45 p.m. It was the N.E. point of the eastern peninsula of Taimyr, situated in lat. 76° 30′ N., long. 113° E. For 15 to 16 miles seaward there appeared to be no ice, and the depth at 6 miles from the land varied between 6 and 12 fathoms.

With a clear look-out around, and a breeze from the north-west, sail was made along the eastern side of the Taimyr peninsula in a smooth sea. Inland the mountains appeared to attain an altitude of from 2,000 to 3,000 feet, and generally free from snow, though here and there some showed, as well as a few small glaciers, which, however, did not reach the sea level within 800 to 1,000 feet. Dredging in 35 fathoms, the result was a rich harvest of the fauna of the region, evidently forms of life exclusive appertaining to the glacial ocean, and without any admixture from southern seas such as would certainly be found in the vicinity of Spitzbergen. These researches lead up to important questions in connection with the last epoch of the world's history.

At times no ice was visible in any direction, and as the vessels had previously met with land where the charts indicated sea, so here they were shaping their course over what the charts indicated as land. At 11 a.m. on the 24th of August, the look-out announced, "land on the port bow." This was evidently Preobrashensk island, fronting the mouth of the Chatanga river, and which is fully four degrees westward of its position on the chart. On making the island, they anchored for a few hours to examine the locality.

But, impatient of delay, they started again at 10 p.m. Shaping a course between the parallels of 73° and 74°, with darker and longer nights, required great circumspection, especially with charts on which little reliance could be placed; moreover the depths rarely exceeded 5 to 8 fathoms as far as the mouth of the Lena. They had splendid weather after the 23rd, and were sailing in an ice-free sea. Nordenskiöld attributes this absence of ice along the northern shores of Siberia towards the end of summer to the quantity of warm water brought into the glacial sea by the great Siberian rivers. The waters of the Obi and Yenisei trend north-eastward with the lay of

the coast, and the waters of the Chatanga, Anabara, Olensk, Lena, Yana, Indigirka and Kolyma, which are situated eastward of Taimyr peninsula, take a more easterly trend, all, more or less warmed during the short but hot Siberian summer. Before starting, Nordenskiöld had anticipated this, and observations on the temperature and saltness of the water showed that he was correct in his estimate.

It had been the intention to anchor at the mouth of the Lena; but with a fair wind and ice-free sea, the *Vega* parted company from the *Lena* on the night of the 27th. The latter went for her destination, the river Lena, and the former steered for Fadey of island, one of the New Siberia group, whence a departure was to be taken for Behring strait and Japan; but as we now know she had to winter in the Arctic seas. She had, however, very nearly accomplished the N.E. passage in one season, for while we write intelligence has reached Europe that the *Vega*, all well on board, is frozen in near Serdze-kamen, in lat. 67° 3′ N., long. 171° 33′ W., and less than 100 miles from Behring strait.

Mr. Siberiakoff, the Russian merchant, who is most largely interested, from a commercial standpoint, in opening up the resources of Siberia, has prepared a steamer, already launched at Malmö, to meet the *Vega*; but it appears to be by no means unlikely that Nordenskiöld will pass into the Pacific without any extraneous aid. It is however proposed that the new steamer, proceeding *viâ* the Suez Canal to Japan, shall coal at Yokohama, and thence, taking a departure for Behring strait, try to round the north point of Asia from the westward.

Note.—It will be seen that from the observations of the Swedish expedition the whole of the Taimyr peninsula had been bodily placed on charts and maps several degrees too far to eastward.

CORRESPONDENCE.

THE ACTION OF SCREW-PROPELLERS.

To the Editor of the "Nautical Magazine."

SIR,—As the action of screw-propellers is now attracting a good deal of attention among seamen, I venture to ask you to insert a remark on one point of your correspondent "W.C.'s" useful notes, viz., on the statement that "a right-handed propeller going continuously ahead will turn a vessel round faster under the starboard than under the port helm."

This is, I think, not so supported by evidence as to be acceptable as a general rule, and as I have served in a right-handed screw-steamer, where we carried starboard helm, I think it incorrect, but the fact that a difference of opinion exists shows the necessity for further experiment.

When a vessel has not attained uniform motion under the action of her engines, so that the screw blades above and below the axis of the propeller are working with great slip, doubtless, unless the upper blades are deeply immersed, the lower ones experience most resistance, and deliver most water sternward, hence, if calm and smooth, the vessel would turn from a stationary position fastest to port; but when uniform motion has been attained, it appears highly probable, from the writings of Professor Osborne Reynolds, and others, that the wake motion and dead water cause the blades above the axis to be working with considerable slip, while those below are working with very much less; hence, there would be a resultant lateral thrust transmitted to the screw shaft, in a direction opposite to that in which the upper blade was moving or tending to turn the bow to starboard.

It seems worth noticing that if the screw be reversed while the vessel have headway and wake motion, the same causes would transfer the superiority of thrust to the lower blade, hence, as in s.s. *Hankow*, when the engines were reversed at a speed of ten knots and helm amidships the ship turned to starboard, and showed your correspondent's second proposition to be true.

Your obedient servant,

May, 1879. S. L.

TIDE TABLES FOR JUNE, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	10 28	11 0	2 47	3 15	—	0 18	11 12	11 39	1 53	2 27
M	2	11 31	—	3 43	4 11	0 45	1 12	—	0 6	2 58	3 28
Tu	3	0 1	0 27	4 39	5 6	1 39	2 5	0 33	1 0	3 56	4 23
W	4	0 55	1 22	5 3[illegible]	6 0	2 31	2 56	1 27	1 54	4 50	5 17
Th	5	1 49	2 17	6 27	6 54	3 21	3 46	2 19	2 44	5 44	6 10
F	6	2 41	3 7	7 21	7 46	4 12	4 37	3 9	3 33	7 35	6 5[illegible]
S	7	3 31	3 56	8 10	8 34	5 2	5 27	3 57	4 22	7 21	7 43
S	8	4 21	4 44	8 58	9 22	5 52	6 17	4 47	5 11	8 5	8 26
M	9	5 8	5 31	9 46	10 9	6 42	7 7	5 36	6 1	8 47	9 7
Tu	10	5 55	6 18	10 34	11 1	7 32	7 59	6 27	6 54	9 28	9 50
W	11	6 42	7 7	11 29	11 58	8 27	8 55	7 22	7 50	10 12	10 36
Th	12	7 32	7 57	—	0 27	9 24	9 55	8 18	8 47	11 0	11 27
F	13	8 24	8 54	0 56	1 24	10 26	10 54	9 17	9 47	11 59	—
S	14	9 26	9 58	1 51	2 18	11 22	11 50	10 15	10 43	0 32	1 6
S	15	10 30	11 0	2 45	3 12	—	0 18	11 11	11 38	1 38	2 10
M	16	11 29	11 56	3 40	4 8	0 44	1 10	—	0 4	2 41	3 9
Tu	17	—	0 21	4 33	4 55	1 34	1 55	0 27	0 48	3 35	3 59
W	18	0 44	1 7	5 16	5 37	2 15	2 34	1 9	1 30	4 22	4 45
Th	19	1 28	1 49	5 57	6 17	2 53	3 12	1 50	2 10	5 5	5 25
F	20	2 8	2 26	6 37	6 57	3 31	3 50	2 29	2 48	5 44	6 3
S	21	2 45	3 3	7 17	7 36	4 9	4 27	3 6	3 24	6 22	6 41
S	22	3 21	3 40	7 54	8 12	4 46	5 5	3 42	4 0	6 59	7 17
M	23	4 0	4 19	8 32	8 52	5 26	5 47	4 20	4 41	7 35	7 54
Tu	24	4 39	4 58	9 13	9 34	6 8	6 29	5 2	5 23	8 13	8 33
W	25	5 19	5 39	9 55	10 17	6 50	7 13	5 46	6 10	8 53	9 13
Th	26	6 8	6 27	10 42	11 9	7 40	8 7	6 35	7 2	9 36	10 1
F	27	6 53	7 18	11 33	—	8 36	9 5	7 30	8 0	10 26	10 54
S	28	7 45	8 14	0 8	0 40	9 38	10 12	8 32	9 5	11 24	11 58
S	29	8 44	9 18	1 11	1 42	10 46	11 20	9 41	10 13	—	0 30
M	30	9 58	10 28	2 18	2 45	11 52	—	10 46	11 17	1 14	1 51

Week Day.	Month Day.	Dover. A.M.	Dover. P.M.	Weston-Super-Mare. A.M.	Weston-Super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	7 24	7 54	2 45	3 19	7 49	8 17	8 22	8 52
M	2	8 24	8 54	3 54	4 29	8 45	9 13	9 22	9 52
Tu	3	9 23	9 52	5 3	5 33	9 39	10 5	10 21	10 49
W	4	10 21	10 50	6 3	6 33	10 32	10 59	11 17	11 45
Th	5	11 19	11 47	7 1	7 28	11 26	11 58	—	0 13
F	6	—	0 14	7 52	8 15	—	0 18	0 41	1 7
S	7	0 41	1 7	8 38	9 0	0 42	1 6	1 31	1 55
S	8	1 32	1 57	9 22	9 43	1 29	1 52	2 19	2 42
M	9	2 21	2 45	10 3	10 22	2 15	2 38	3 5	3 27
Tu	10	3 9	3 32	10 41	11 0	3 1	3 24	3 50	4 13
W	11	3 55	4 17	11 22	11 45	3 48	4 14	4 37	5 1
Th	12	4 39	5 3	—	0 11	4 41	5 11	5 25	5 51
F	13	5 28	5 53	0 39	1 8	5 43	6 15	6 20	6 49
S	14	6 18	6 48	1 38	2 9	6 47	7 18	7 18	7 47
S	15	7 21	7 51	2 42	3 14	7 48	8 16	8 17	8 47
M	16	8 20	8 46	3 46	4 17	8 42	9 6	9 17	9 44
Tu	17	9 9	9 32	4 44	5 10	9 28	9 49	10 7	10 29
W	18	9 54	10 16	5 35	5 58	10 9	10 29	10 51	11 13
Th	19	10 38	11 0	6 21	6 42	10 49	11 9	11 35	11 56
F	20	11 22	11 43	7 3	7 23	11 29	11 49	—	0 17
S	21	—	0 4	7 42	8 0	—	0 8	0 37	0 56
S	22	0 25	0 46	8 18	8 36	0 26	0 45	1 15	1 34
M	23	1 6	1 27	8 55	9 14	1 4	1 23	1 54	2 14
Tu	24	1 48	2 9	9 33	9 51	1 43	2 3	2 34	2 54
W	25	2 31	2 54	10 10	10 29	2 24	2 46	3 14	3 36
Th	26	3 17	3 40	10 49	11 10	3 10	3 34	3 59	4 23
F	27	4 3	4 27	11 33	11 59	3 59	4 2[illegible]	4 47	5 12
S	28	4 51	5 17	—	0 28	4 56	5 29	5 39	6 8
S	29	5 45	6 14	1 0	1 33	6 5	6 42	6 40	7 18
M	30	6 50	7 27	2 10	2 48	7 19	7 58	7 49	8 25

Week Day.	Month Day.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	1 8	1 41	7 34	8 3	4 41	5 3	0 10	0 39
M	2	2 13	2 44	8 33	9 5	5 27	5 53	1 8	1 37
Tu	3	3 14	3 43	9 34	10 0	6 20	6 48	2 5	2 31
W	4	4 11	4 39	10 25	10 50	7 16	7 43	2 57	3 23
Th	5	5 6	5 33	11 15	11 40	8 8	8 30	3 49	4 15
F	6	5 59	6 24	—	0 5	8 53	9 16	4 41	5 5
S	7	6 48	7 12	0 30	0 55	9 39	10 2	5 29	5 52
S	8	7 35	7 57	1 20	1 45	10 25	10 49	6 16	6 40
M	9	8 19	8 41	2 10	2 35	11 15	11 46	7 4	7 28
Tu	10	9 3	9 25	3 0	3 25	—	0 18	7 52	8 16
W	11	9 47	10 9	3 50	4 18	0 50	1 24	8 40	9 4
Th	12	10 37	11 5	4 46	5 15	1 58	2 32	9 31	10 1
F	13	11 34	—	5 44	6 11	3 3	3 30	10 32	11 8
S	14	0 3	0 33	6 38	7 5	3 55	4 19	11 35	—
S	15	1 5	1 37	7 33	8 1	4 43	5 5	0 7	0 36
M	16	2 7	2 34	8 29	8 56	5 26	5 47	1 4	1 31
Tu	17	2 59	3 23	9 20	9 43	6 8	6 29	1 58	2 14
W	18	3 45	4 7	10 4	10 22	6 50	7 11	2 34	2 54
Th	19	4 28	4 48	10 40	10 58	7 32	7 52	3 14	3 34
F	20	5 8	5 28	11 17	11 36	8 11	8 28	3 54	4 14
S	21	5 48	6 8	11 55	—	8 45	9 2	4 32	4 50
S	22	6 27	6 46	0 14	0 34	9 19	9 37	5 8	5 27
M	23	7 6	7 26	0 55	1 16	9 56	10 16	5 47	6 7
Tu	24	7 46	8 6	1 37	1 58	10 37	10 59	6 27	6 48
W	25	8 26	8 47	2 20	2 43	11 24	11 55	7 11	7 35
Th	26	9 10	9 33	3 8	3 34	—	0 27	8 0	8 25
F	27	9 57	10 23	4 1	4 30	1 1	1 36	8 50	9 18
S	28	10 53	11 20	5 1	5 32	2 14	2 50	9 49	10 23
S	29	11 59	—	6 3	6 34	3 23	3 58	10 58	11 36
M	30	0 35	1 12	7 6	7 39	4 20	4 47	—	0 18

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, – *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	–1 17	Leith
Aberystwyth	–3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	–0 42	Leith
Arcachon	+0 50	Brest
Arklow	–2 25	Kingstown
Ayr	–0 18	Greenock
Banff	–1 49	Leith
Bantry harbour	–1 14	Queenstown
Barnstaple bridge	–0 26	Weston-s.-Mare
Bayonne	–0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	–0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	–1 5	N. Shields
Blyth	–0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	–2 2	Brest
Caernarvon	–1 56	Liverpool
Calais	+0 37	Dover
Campbellton	–0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	–4 22	Liverpool
Carlingford bar	–0 10	Kingstown
Chatham	–0 47	London
Cherbourg	+4 2	Brest
Coleraine	–1 37	Londonderry
Coquet Road	–0 23	N. Shields
Cordouan Tower	–0 10	Brest
Cowes (West)	–0 27	Dover
Crinan	+4 41	Greenock
Cromarty	–2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	–0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	–0 16	Kingstown
Dungeness	–0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	–0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	–0 47	Brest
Flamborough head	–1 59	Hull
Fleetwood	–0 12	Liverpool
Folkestone	–0 5	Dover
Fowey	–0 29	Devonport
Flushing	+1 42	Dover
Galway bay	–0 26	Queenstown
Gibraltar	–1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	–0 48	London
Grimsby (Great)	–0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	–1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	–1 12	Liverpool
Holy Island harbour	–0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	–1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	–0 18	Queenstown
Lerwick (Shetland)	–3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	–1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	–0 38	Weston-s.-Mare
Lowestoft	–4 1	London
Lynn & Boston Deep	–0 29	Hull
Margate	–2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	–0 58	Weston-s.-Mare
Montrose	–0 52	Leith
Morlaix	+1 6	Brest
Needles point	–1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	–1 28	London
Orfordness	–2 43	London
Oporto	–1 17	Brest
Ostende	+1 13	Dover
Padstow	–1 41	Weston-s.-Mare
Peel, Isle of Man	–0 15	Liverpool
Pembroke Dock	–0 42	Weston-s.-Mare
Penzance	–1 13	Devonport
Peterhead	–1 43	Leith
Piel harbour, Barrow	–0 18	Liverpool
Plymouth breakwater	–0 6	Devonport
Poole	–2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	–0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	–2 19	London
Rotterdam	+4 33	Dover
Santander	–0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	–1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	–0 42	Dover
Spurn point	–1 3	Hull
St. Ives	–2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	–1 16	Devonport
St. Nazaire	–0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	–5 17	Leith
Sunderland	–0 1	N. Shields
Swansea bay	–0 53	Weston-s.-Mare
Tay bar	–0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	–1 12	Weston-s.-Mare
Thurso	–5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	–0 58	Queenstown
Ushant (Ouessant)	–0 15	Brest
Valentia harbour	–1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	–0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	–0 9	Liverpool
Wick	–2 55	Leith
Wicklow	–0 41	Kingstown
Workington	–0 19	Liverpool
Yarmouth road	–4 43	London
Youghall	+0 13	Queenstown

WEATHER FORECAST FOR JUNE, 1879.

The Currents or Tendency of the Air over the British Islands for the Month of June, 1879.

Date.	Duration.	Force from N. or S.	Force from E. or W.	General Direction from	Duration.	Force from N. or S.	Force from E. or W.	General Direction from
June								
1	9 h.a. to 4 h. fol. a.	11	6	N.N.E.	3 h.a. to 9 h.a.	5	3	S.S.W.
2	11 a. „ 4 „	9	6	„	4 a. „ 11 a.	4	3	„
3	... ...	...	...	...	4 a. „ 2 fol. m.	4	3	S.W.
4	2 m. to 4 a.	6	7	N.E.	4 a. „ 4 „	3	3	„
5	4 m. „ 7 a.	0	10	E.	7 a. „ 5 „	0	5	W.
6	5 m. „ 7 a.	2	10	E.S.E.	7 a. „ 7 „	1	5	W.N.W.
7	7 m. „ 6 a.	5	10	„	6 a. „ 8 „	2	5	„
8	8 m. „ 6 a.	8	9	S.E.	6 a. „ 10 „	4	4	N.W.
9	10 m. „ 6 a.	10	9	„	6 a. „ 11 „	5	4	„
10	11 m. „ 6 a.	11	9	S.W.	6 a. „ fol. noon	5	4	„
11	Noon „ 6 a.	11	9	„	6 a. „ „	5	4	„
12	„ „ 7 a.	11	9	„	7 a. „ 1 fol. a.	5	4	„
13	1 a. „ 8 a.	10	9	„	8 a. „ 2 „	5	4	„
14	2 a. „ 8 a.	10	9	„	8 a. „ 2 „	5	4	N.E.
15	2 a. „ 10 a.	9	9	„	10 a. „ 2 „	4	4	„
16	2 a. „ midnight	7	10	W.S.W.	... ...	...	...	...
17	3 a. „ 2 fol. m.	5	10	„	0 m. „ 3 a.	2	5	E.N.E.
18	3 a. „ 4 „	3	11	„	2 m. „ 3 a.	1	5	„
19	5 a. „ 4 „	0	12	W. by N.	4 m. „ 5 a.	0	6	E. by S.
20	6 a. „ 6 „	2	11	W.N.W.	4 m. „ 6 a.	1	5	E.S.E.
21	4 a. „ 7 „	5	10	„	6 m. „ 4 a.	2	5	„
22	4 a. „ 9 „	7	10	„	7 m. „ 4 a.	3	5	„
23	4 a. „ 9 „	9	9	N.W.	9 m. „ 4 a.	4	4	S.E.
24	4 a. „ 10 „	11	8	N.N.W.	9 m. „ 4 a.	5	4	S.S.W.
25	5 a. „ 11 „	12	7	„	10 m. „ 5 a.	6	3	„
26	5 a. „ fol. noon	12	7	„	11 m. „ 5 a.	6	3	„
27	6 a. „ 1 fol. a.	12	6	„	Noon „ 6 a.	6	3	„
28	7 a. „ 2 „	11	6	N.N.E.	1 a. „ 7 a.	5	3	„
29	9 a. „ 2 „	10	6	„	2 a. „ 9 a.	5	3	„
30	11 a. „ 2 „	7	7	N.E.	2 a. „ 11 a.	3	3	S.W.

Note.—Sun's gradients at first N. Easterly, then S. Easterly succeeded by S. Westerly about the beginning of July.

REMARKS.

1. The Table indicates — Probable Winds.

Strong N. Easterly tendency from the 1st to the 4th — N. Wly. to N. Ely. in the N. S. Wly. to Sly. in the South.

Strong S. Easterly tendency from the 5th to the 9th, N.Ely. and S.Wly.

„ S. Westerly „ „ 10th „ 18th, light S.Wly. to S.Ely.

„ N. Westerly „ „ 19th „ 27th, N.Ely. backing to S.Wly.

„ N. Easterly „ „ 28th „ 30th, N.Wly. to Wly.

2. Moon going South from the 1st to the 4th.
   „ coming North „ 5th „ 19th.
   „ going South „ 20th „ 30th.

3. Change from the Westerly to the Easterly tendency about the 1st.
   „ „ Easterly „ Westerly „ „ 10th.
   „ „ Westerly „ Easterly „ „ 28th.

4. General Forecast:—

1st to the 10th, Stormy: being period of Moon's Easterly tendency. It would be noticed that the corresponding period of Moon's Easterly tendency for April (8th to the 15th) and May (5th to the 14th) were stormy. During this period the strongest gale will probably occur on the 1st or 2nd, from the N.W. to the N.E., if pressure one or two days previously relatively high to the S.W., or, what is the same thing, if wind Westerly to North-Westerly, but if pressure relatively high to the North and East then gale will probably blow from S.E. to N.E.

11th „ 19th, Generally fine with occasional thunderstorm.

20th „ 27th, Changeable.

28th „ 30th, Stormy. Moderate Westerly to North-Westerly gale probable on 28th or 29th.

5. The gale predicted on the 6th of May blew from N.W to N.E. instead of from S.E. This was caused by pressure being previously relatively high to the South and West. It must be understood that the General Forecast is based upon an examination of past weather, and being necessarily imperfect, I would deprecate attention being paid to it to the exclusion of the Table of Currents which is really the more important.

D. D.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C., and* 6, *Lord Street, Liverpool.*

ENGLISH (APPLICATIONS).

1517. Edward Lyon Berthon, Romsey, Hampshire. "Improvements in collapsing boats, canoes, and canoe-shaped boats covered with canvas."

1541. Meredith Jones, London. "An apparatus to prevent the jerks and counteract the strains incidental to chains, ropes, lifts, hoists, cables, or other weighing, lifting, hoisting, hauling, towing, mooring arrangement."

1570. John Harris, Wellclose Square, Middlesex. "Improvements in indicating lamps and apparatus for use on board ship."

1580. Joseph Warren Fowle, Boston, U.S.A. "Improvements in code of ships' fog-signals and fog-signal apparatus." (Complete specification.)

1581. Joseph Warren Fowle, Boston, U.S.A. "Improvements in code of ships' night signals and apparatus." (Complete specification.)

1586. Charles Ross Fimey, Sunderland, Durham. "Improvements in mechanism for steering ships by steam power."

1588. John Horner Fitzgerald, St. Andrews, Fife. "A new or improved construction of net-hauling machine."

1649. George Hill, South Shields. "Improvements in apparatus used in connection with marine steam engines for condensing the exhaust steam, and supplying feed water to boilers."

1650. John Fitzgerald, Old Charlton, Kent. "Improvements in ships' signals for preventing or lessening the risk of collisions."

1662. George Daniel Davis, Stepney, Middlesex. "Improvements in valve apparatus for use in steering ships and other vessels by steam power."

1670. Nicholas Demetrius Spartali, Liverpool. "Improvements in screw-propellers."

1675. Alexander Friedman, Vienna, Austria. "Improvements in apparatus for increasing the draft in chimneys or funnels for propelling fresh air into the stoke-holes or stoke-rooms of steam-ships, and for ventilating purposes generally." (A communication.)

1685. William John Butler. "Improved means or apparatus for imparting motion to the propellers of launches, boats, canoes, punts, and other such like floating vessels."

1685. Henry Horatio Ham, Jun., and Elbridge Gerry Pierce, Jun. "Improvements in clocks for marine or other purposes." (A communication.) (Complete specification.)

1766. Evan Henry Hopkins. "Improved method of demagnetizing iron ships or composite ships."

1787. Thomas Arthur Dillon. "Improved means and apparatus for raising sunken ships and other submerged bodies."

1801. Kennard Knott. "Improvements in dry air refrigerating and apparatus therefor, applicable to ships, railway and other carriages, or to stationary purposes."

1882. Courtenay Osborne Weeks. "An improved life-saving appliance capable of adaptation to cabin furniture."

1899. George Donkin and Bryce Gray Nichol, both of Newcastle-on-Tyne. "Improvements in steam-steering apparatus."

1915. George H. Hammond, Detroit, U.S.A. "Improvements in and relating to the construction of refrigerating rooms or chambers in ships for the preservation of meat and other perishable substances." (A communication.)

1943. Alexandra Morton, Glasgow. "Improvements in screw-propellers for propelling vessels."

AMERICAN.

212847. James B. Green. "Wave-powers for propelling vessels."

213213. Thomas Lee. "Construction of hulls for vessels."

AUSTRIAN.

3428. P. Jacquel. "Improvements in screw-steamers."

BELGIAN.

47618. G. G. Lawrence. "An apparatus for raising and lowering ships' boats."

47659. C. Hill. "A construction and arrangment of bars of marine and other boiler furnaces."

FRENCH.

126821. Moller. "A floating weir."

126831. Forster. "A screw-propeller."

126892. Chaffaud and Barbotin. "A hammock-buoy for saving life at sea."

126919. Plath. "A contrivance in compasses for the automatic compensation of the deviation caused by the careening of ships."

126927. Chaffaud and Barbotin. "Steady and insubmersive bath boats."

126976. Roturier. "A regular for ships' screws."

127183. Twasey. "A screw-propeller."

127433. Foulis. "An apparatus for and means of preventing leakage and ventilating ships."

127565. Bouniol and Portalier. "A screw-boat propelled by hand."

127567. Payenneville. "A rowing apparatus."

127666. Cuche. "An atmospheric propeller for vessels, ships and boats."

GERMAN.

5238. H. De Burgh Lawson. "An arrangement of paddle-wheels for steamers in recesses of the submerged body of the vessel, from which the water is partly removed by compressed air."

5534. E. Engström and Co. "An apparatus for climbing masts, telegraph-poles, and similar objects."

5619. J. F. Schultheiss. "Modifications in life-boats."

5686. R. W. Cowan and C. Pagé. "Feathering paddle-wheels for propelling balloons and submarine vessels."

5750. F. A. Fippner. "A safety apparatus for vessels."

5763. H. C. Hansen. "An apparatus for cleansing iron ships' bottoms."

SPANISH.

Comez, Zarzuela and Perez. "A life apparatus for the navy."

Lafargue and Martin. "Improvements in hydraulic machinery for steering vessels, applicable also for propelling and reversing steam and other motors."

SWEDISH.

145. C. G. K. Lundborg. "A construction of vessels for frozen water."

197. H. Meyer. "A swimming and life-belt."

231. J. B. Giertz. "A life-buoy."

Patents Published.

3530. Richard Richards, Manchester. "Improvements in vessels and appliances for raising sunken ships, and other submerged bodies." This consists in fitting hollow columns to steam-

vessels, extending from the main-deck to the keel, and there being open to the water. On the main-deck a pair of standards are placed, one on each side of each of the hollow columns, with a cross-head working in grooves in the standards, which forms a clamp for gripping a wire-rope or chain passing down the hollow column, and secured to the sunken ship. Beneath the cross-head a pair of powerful hydraulic presses are placed, which raise the cross-head and the weight secured to it a short distance each time, the rope or chain being clamped between decks, and the cross-head re-adjusted for another lift. Two vessels of similar construction are preferably used, that the chain passing beneath the sunken ship may be raised at both ends simultaneously.

3714. Richard Rose, Leadenhall Street, London. "Improvements in apparatus for saving life in the water, and for extinguishing fire on board ship." This refers to the construction of seats for passengers, and consists of a vessel constructed of metal in two parts, capable of being used as a seat, and which, when thrown overboard, from its buoyancy will support two or more persons. The seat resembles in shape a double egg cup, and is capable of being unscrewed in the middle, so that in the event of a fire occurring on board, the two vessels may be employed in carrying water. Each half of the seat is provided with a lid, and forms a receptacle for food, water, papers, &c., in case of wreck. When required only as a life-buoy, the lids are fastened down, and furnished only with endrails and central lines.

3751. Edward Gardner Colton, of the office of Wm. P. Thompson and Co., Patent Agents, 6, Lord Street, Liverpool. "Improvements in or appertaining to marine engine governors." (A communication in trust to him from abroad, by John A. Suedberg, of Washington, District of Columbia, U.S.A.) The object of this invention is to produce a simple and efficient mechanism for the purpose of automatically regulating the speed of a marine engine when the vessel is exposed to rough seas, in which the propeller is often raised partly or wholly out of the water. It consists of a pipe, fixed outside the vessel, open for the admission of water, and communicating on the inside with an air chamber. To a diaphragm, connected by a pipe to the air chamber, is

jointed a lever, pivotted to the stem of the balanced piston valve, in connection with a small intermediate steam cylinder. When the propeller is immersed, the air in the air chamber is considerably compressed by the water in the communication pipe, with a head nearly equal to the perpendicular distance from the pipe to the water-line at the stern-post, and as the air communicates with the diaphragm the latter will be expanded, thereby moving the lever jointed to it and valve to which the lever is pivotted, and admitting steam to the intermediate steam cylinder, which moving the cylinder with its connections, instead of the piston, in the same direction keeps the throttle valve open for the admission of steam to the main engine. As soon, however, as the propeller rises in the water, the head of water, and consequently the pressure, becomes gradually less; the diaphragm will be contracted, thereby moving the valve in the opposite direction, causing a similar movement in the cylinder and throttle valve, thus gradually shutting off steam to the main engine. A ball governor may be substituted for the diaphragm if it is desirable to take the motion of the governor from the engine itself.

3776. David Kennedy, Liverpool. "Improvements in and relating to steering apparatus, worked by steam or other fluid, parts of which are applicable to other purposes where steam-engines are used." This consists first in placing on the hand-wheel shaft a cam, resembling a crown wheel, it being a disc with a series of small cams on the side near the circumference; secondly, in connecting the cylinders by piston-rods with a second shaft, having a worm that gears into the chain barrel, excentrics being placed on the shaft with the worm wheel, with rods jointed to the valve-rods, with springs and valve connections so arranged as to prevent the valve from over-running the engine. The chain barrel may also be connected by a clutch with the wheel-shaft, so as to work by hand when required.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
146	ENGLAND—East Coast—Yarmouth District —Hewett Channel	Alteration of buoy.
147	„ „ Leman and Ower Light	To be changed on August 1st.
148	„ Scilly Islands—Seven Stones	Light to be changed on July 1st.
149	„ Bristol Channel—Bull Point and Bideford	New Light, &c., on June 30th.
150	„ St. George's Channel—Bahama Bank Light	To be changed on July 1st.
151	NORTH SEA—Elder River	Light-vessel replaced.
152	BALTIC—The Sound—Elsinore	Alteration of mole head light.
153	„ „ Flint Channel — Malmö	New leading light.
154	„ „ „ „ Siollen Light-vessel	Intended alterations.
155	„ „ Hveen Island — Kyrkbacken	New harbour light.
156	„ Sweden—Carlskrona	Intended alteration in lights.
157	„ „ Kalmar Sund	Prohibited anchorage.
158	„ Prussia—Rugen Island—Palmerort	Alteration carried out.
159	„ „ Memel	New light for fishing vessels.
160	GULF OF BOTHNIA—Sweden	New lights proposed, fog-signals, &c.
161	FRANCE—West Coast—Belle Ile—Kerdonis Point	New light.
162	SPAIN—West Coast — Vigo Bay — Cies Islands	Light irregular in action.
163	„ „ Cristina Island—Higuerita Bar	Leading lights altered in position.
164	MEDITERRANEAN—Spain—Valencia	Alterations in lights.
165	„ Sardinia—Bonifacio Strait—Cape Ferro	Temporary alteration of light.
166	„ Adriatic—Grado Light-vessel	Proposed change of light.
167	„ „ Merter Bay — Stretto	Alteration of light.
168	„ Asia Minor—Bashika Bay	New buoy off the point.
169	AFRICA—West Coast—Senegal — Gorée Bay—Rufisque	New light.
170	„ East Coast—Zanzibar	New buoys and beacons.
171	INDIAN OCEAN—Réunion	Alteration in lights.
172	„ „ St. Pierre	New harbour light.
173	INDIA—Bay of Bengal—Andaman Islands	Dangerous rocks near S. Brother
174	„ „ Alguada Reef and Diamond Island	Sunken dangers near them.
175	EASTERN ARCHIPELAGO—Borneo—Sarawak River	Sunken rock near Samarang rock.
176	CHINA — East Coast — Yangtse-kiang — Wusung	Alteration of tidal signals on the bar.
177	SOUTH AUSTRALIA—Investigator Strait—Althorpe Island	Range of light.
178	SOUTH AMERICA — Magellan Strait — Crooked Rock	Its position.
179	„ La Plata—Uruguay	Change in entrance channel.
180	NEWFOUNDLAND—Lamelin Harbour, Allan Island	New light.
181	„ Hermitage Bay—Pass Island	New lights.

NAUTICAL NOTICES.

146.—England.—*East Coast.—Yarmouth District.—Hewett Channel.—Alteration of Position of Buoy.*—In consequence of the sand at the South Scroby Elbow having shifted about half-a-mile to the northward, the South Scroby Elbow buoy has been moved 3 cables N. by E. ¼ E., and now lies in 10 fathoms at low-water spring tides, with the following marks and bearings, viz. :—The highest mill at Southtown, its breadth westward of St. Peter's church at Yarmouth, N.W. N^ly.; Gorleston church in line with the north end of a wood, W.; Scroby Elbow (bell buoy) N. by E. ¼ E., distant $2\frac{3}{10}$ths miles; S.W. Scroby buoy, N.N.E. ¼ E., distant $\frac{7}{10}$ths of a mile; S. Scroby spit buoy, S. ½ E., distant $\frac{9}{10}$ths of a mile; N. Corton buoy, S. ½ W. S^ly., distant 1 mile; St. Nicholas light-vessel, S.W. ½ S., distant $\frac{4}{10}$ths of a mile, nearly.

Note.—There is now only 19 feet at low-water spring tides across the swatch, in the line of the N.W. and S.E. Corton buoys.

147.—England.—*East Coast—Leman and Ower Light.*—The *alteration* mentioned on p. 356 will probably be carried out on the 1st of August next.

148.—England.—*Scilly Islands.—Alteration in the Character of the Light at the Seven Stones.*—With regard to the intention to change the character of the Seven Stones light from two fixed lights to *one white revolving light, showing three flashes in quick succession,* followed by an interval of 36 *seconds of darkness,* the whole revolution to occupy one minute, the alteration will probably be made on or about the 1st July next.

149.—England.—*West Coast.—Bristol Channel.—New Lighthouse on Bull Point, and improvement of Bideford High Light.*—The *alterations* mentioned on p. 178, will probably be carried out on the 30th of June next.

150.—England.—*St. George's Channel.—Alteration in the character of the Bahama Bank Light.*—As regards the intention to discontinue the two fixed white lights at present shown from the

Bahama Bank light-vessel, and to exhibit in lieu thereof *one white revolving* light, showing *two flashes in quick succession every half-minute,* at an elevation of 38 feet above the sea, the alteration will probably be made on or about the 1st July next.

151.—North Sea.—*Eider River.—Outer Eider Light-Vessel Replaced.*—With reference to previous notice (*see* p. 444, May), on 29th March, 1879, the light-vessel was replaced in position.

152.—Baltic Entrance.—*The Sound—Elsinore* (*Helsingör.*)—*Alteration in Mole Head Light.*—On 1st April, 1879, changed to a *fixed red* light, instead of fixed green as previously.

153.—Baltic Entrance.—*The Sound.—Flint Channel.—Leading Lights at Malmö.*—Since 31st December, 1878, two leading lights have been exhibited.—The High Light, visible through an arc of 45°, shows a *flash* of *one second* duration every *four seconds* between the bearings S. 3° W. and S. 16° E.; a *fixed white* light between S. 16° E. and S. 34° E.; and *two flashes* in quick succession every *four seconds* between S. 34° E. and S. 42° E.; elevated 68 feet above the sea, and visible 12 miles. The lighthouse, constructed of iron, is painted white with two red bands; lantern, red.—The Low Light, visible through an arc of 139°, shows a *fixed red* light between the bearings S. 18° W. and S. 76° E.; a *single flash* between S. 76° E. and S. 88° E.; a *fixed white* light between S. 88° E. and N. 78° E.; and *two flashes* between N. 78° E. and N. 59° E.; elevated 32 feet above the sea, and visible 8 miles. The lighthouse, constructed of iron, and painted white with red lantern, is situated on the new West mole head, and bears N. 16° W. from the high lighthouse, distant 519 yards. The mole light and inner harbour light previously shown, are discontinued.

Note.—Entering Malmö harbour, the new leading lights should be kept in line S. by E. ½ E. On the eastern side of the low lighthouse a reflector has been placed, which throws a light over the new East mole head (painted white). The *green* light on the head of the old East mole, and the *white* light on the old West mole will still be continued. *Variation*, 12° *W.*

154.—Baltic Entrance.—*The Sound.—Flint Channel.—Siollen Light-Vessel, Intended Alterations.*—In the spring of 1879,

the light-vessel will be shifted from her present station to a position near Oscargrund, and when kept in line with Kalkgrund light-vessel, will lead through the deepest water of Flint channel. It will show a *flashing* light.

155.—BALTIC ENTRANCE.—*Hveen Island.—Harbour Light at Kyrkbacken.*—On 1st January, 1879, exhibited from the pier-head at Kyrkbacken, west side of Hveen Island:—It is a *fixed* light, elevated 12 feet above the sea, and shows *red* between the bearings N. by W. and E. by N.; *green* between E. by N. and S. by E.; and *white* between S. by E. and W. by S. Position, lat. 55° 54″ 35′ N., long. 12° 41′ E. To be shown from 1st September to 30th April following.

156.—BALTIC.—*Sweden.—Carlskrona.—Intended Alteration in Lights.*—It is intended in 1879 to make the following alteration:—The light-vessel *Odin* will be withdrawn from her station in the outer road, and the harbour light will be discontinued; in place thereof, a light will be exhibited from the fort (No. 1) on Godnott rock, Carlskrona outer road. The light will be *flashing*, and visible 12 miles; it will be seen from Arpö channel.

157.—BALTIC.—*Sweden.—Kalmar Sund.—Prohibited Anchorage.*—The anchorage between Oswalls ground and Terno, in the fairway of the channel northward of Kalmar, is prohibited; this area is marked by the *fixed white* light shown from Grimskär, between the bearings S. 35° W. and S. 37½° W. Vessels anchored within this prohibited area must shift position immediately on being required to do so by the harbour authorities. *Variation, 9½° W.*

158.—BALTIC.—*Prussia.—Rugen Island.—Greifswald Bay.—Palmerort Light-Vessel.*—The proposed alteration (*see* p. 261, March) has been carried out; it exhibits two *fixed white* lights, placed vertically, elevated respectively 36 and 26 feet above the sea.

159.—BALTIC.—*Prussia.—Leading Light at Memel.*—Exhibited for the use of fishing vessels from a beacon erected near the lighthouse; it is a *fixed red* light, elevated 18 feet above the sea. The beacon, 10 feet high, is situated S.W. by W. ¾ W. from the lighthouse, distant 219 yards.

Note.—This light, kept in line with the principal light, leads through a channel from the South mole head across Süderhaken bank.

160.—Gulf of Bothnia.—Sweden.—*Alterations in* 1879 :—

1. *Grundkallen Light-Vessel.—Intended Alteration in Fog-Signal.*—A steam fog-whistle will be established.

2. *Hudiksvall.—Intended Leading Light.*—It is intended to exhibit a leading light on the Cliff at Hudiksvall.

3. *Skellefteå.—Intended Light on Gåsör Islet.*—From a lighthouse now in course of construction.

4. *Piteå.—Intended Light on Lilla Leskär Rock.*—From a lighthouse now in course of construction on the rock.

161.—France.—*West Coast.—East end of Belle Ile.—Light at Kerdonis.*—From the 1st of June, from a square stone tower recently erected near Kerdonis point. It will show alternately a *fixed white* light during 25 seconds, with 5 *red flashes* during the following 25 seconds, at the height of 126 feet above high-water. Visible 12 miles.

162.—Spain.—*West Coast.—Vigo Bay.—Irregular Action of Cies Islands Light.*—In consequence of injury to the apparatus of the revolving light exhibited on mount Faro, Cies or Bayona islands, approach to Vigo bay, dependence should not be placed on the regularity of the revolution, or the duration of the eclipses.

163.—Spain.—*South-West Coast.—Cristina Island.—Higuerita Bar.—Altered position of Leading Lights.*—Consequent on recent changes in Higuerita bar, alteration has been made in the position of the leading lights (*fixed green*) exhibited on Cristina island. They now bear from each other N. 49¼° W. and S. 49¼° E., distant 63 yards. *Variation*, 18¾° *W.*

164.—Mediterranean.—*Spain.—Port of Valencia.—Alterations in Lights.*—On 22nd March, 1879, the light at the angle of the East mole was changed from fixed red to *fixed green;* and the lights on the transverse mole heads at the harbour entrance, were changed from green to *blue* lights.

165. — Mediterranean. — *Sardinia. — Bonifacio Strait. — Temporary Alteration in Cape Ferro Light.*—The machinery of

the fixed and flashing light at cape Ferro being out of order, a *fixed white* light will be exhibited until the apparatus is repaired.

166.—Mediterranean.—*Adriatic.—Proposed Alteration of the Light of Grado Light-Vessel.*—The present fixed red light will shortly be changed to a *flashing* light, *red* for 30 seconds, and *white* for 30 seconds.

167.—Mediterranean.—*Adriatic.—Morter Bay.—Alteration in Stretto Light.*—The light exhibited on the buttress of the swing bridge is a *fixed red* light, instead of fixed white as previously.

168.—Mediterranean.—*Asia Minor.—Bashika Bay.—Buoy off Bashika Point.*—A buoy has been placed seaward of the shoal ground extending from the point. It is conical, painted red, and moored in 10½ fathoms, with the following bearings and distance, viz.:—Demetrios point tumulus, N.N.E. ¾ E.; North extreme of Bashika point, E.N.E., easterly, distant 6 cables; Ujek Tepeh, E. by S. ¾ S.; Position, lat. 39° 54′ 25″ N., long. 26° 9′ E.

Note.—Tree peak (north side of Dardanelles entrance) in line with Demetrios point tumulus, bearing N.E. by N., leads westward of the shoal ground off Bashika point. *Variation*, 6¼° *W.*

169.—Africa.—*West Coast.—Senegal.—Gorée Bay.—Light near Rufisque.*—Established on 11th January, 1879, near Rufisque, eastern shore of Gorée bay; it is a *fixed red* light, visible 3 miles.

170.—Africa.—*East Coast.—Zanzibar Harbour.—Buoys and Beacons.*—Information has been received relative to alteration in the buoyage of Southern pass; and in the leading mark and buoyage of English pass—approaches to Zanzibar harbour:—

(1.) Southern Pass.—Mtwana shoal buoy, conical and painted black, now lies one cable S.S.W. of its former position, with the shoalest spot of Outer Mtwana shoal bearing E. by S., distant 2 cables.

(2.) The buoy marking the eastern edge of Kisiki bank is now painted black and white in vertical stripes, with staff and square.

(3.) English Pass.—Walleso house being hidden by trees, and no longer available as a leading mark, two beacons have been erected on the shore in front of Mtoni palace, which kept in line with

a white door in the centre of the palace bearing S.S.E. ⅛ E., lead through the northern portion of English pass. The beacons, 30 feet high, consist of poles painted black and white; the outer beacon is surmounted by a square painted white; the inner by a triangle painted white.

(4.) The buoys marking the eastern edge of Chapani reef, are now cask-shaped and painted red. *Variation*, 10½° *W*.

171.—INDIAN OCEAN.—*Réunion.—Alterations in Lights at St. Paul and St. Denis.*—The following alterations have been made :—

(1.) *St. Paul Bay.*—The light is now *fixed red*, elevated 62 feet above the sea, and visible 4 miles.

(2.) *St. Denis.*—The upper light is now *fixed red*, the lower *fixed white*, visible 7 miles.

Position as given (St. Denis), lat. 20° 51′ 40″ S., long. 55° 26′ 55″ E.

172.—INDIAN OCEAN.—*Réunion Island.—Harbour Light at St. Pierre.*—Exhibited from a mast at the harbour office; it is a *fixed red* light, visible 4 miles. Position as given, lat. 21° 19′ 50″ S., long. 55° 28′ 40″ E.

Note.—It is intended to replace the lights at St. Paul and at St. Pierre by others of greater power.

173.—INDIA.—*Bay of Bengal.—Andaman Islands.—Rocks off South Brother Island.*—These dangerous rocks—sunken and awash—extend from the southernmost of the Brothers' islands in a N.N.W. direction for a distance of from 1½ to 2 miles; and in a S.E. direction for the distance of about 1½ miles.

Caution.—Vessels should consequently be navigated in this vicinity with great care.

174.—INDIA.—*Bay of Bengal.—Bassein River Entrance.—Sunken Dangers between Alguada Reef and Diamond Island.*—The result of a recent examination shows *five separate ridges*, extending in a north-east and south-west direction, about half-a-mile in width, on which are dangerous rocky patches with from 4 to 13 feet water on them, completely obstructing the channel between Alguada reef and Diamond island. The shoalest patch found, now named *Hugh Rose rock*, and on which the ship *Inchmarnock* struck in April, 1877, has 3 to 4 feet over it at low water, and lies N.N.E. ¼ E. from Alguada reef lighthouse, distant 2½ miles.

Caution.—This channel is most dangerous, and absolutely barred to shipping.

Note.—Alguada reef lighthouse is situated S. ⅜ W. distant 15¼ miles from the pagoda on Pagoda point; it is also distant nearly three-quarters of a mile in a S.W. by W. direction from the position formerly assigned to it on the charts. Position approximate, lat. 15° 41′ 40″ N., long. 94° 10′ 35″ E. *Variation, 2½° E.*

175.—EASTERN ARCHIPELAGO.—*Borneo.*—*Sarawak River.*—*Sunken Rock South-West of Samarang Rocks.*—This pinnacle rock has 9 feet over it at low-water spring tides, and deep water between it and Samarang rocks; its approximate position is nearly half-a-cable W. by S. of the south-western extreme of Samarang rocks, and 80 yards from the right bank of the river.

176.—CHINA.—*East Coast.*—*Yangtse-Kiang.*—*Wusung Inner Bar.*—*Alteration in Tidal Signals.*—Balls, cones, squares, &c., are now substituted for the flags previously used at the inner bar station, Wusung river, to indicate the depth of water on the bar during the day; but should there be more water on the bar than 24½ feet, or less than 10 feet, the number of feet will be shown from the mast-head by the International Code of Signals, and the half feet by a red and white flag at the yard arm.

177.—SOUTH AUSTRALIA.—*Investigator Strait.*—*Althorpe Island Light.*—When navigating in Spencer gulf in ordinary weather, the bright part of Althorpe island light will be seen over the low land of the south end of Yorke peninsula, on the following bearings from the lighthouse, viz., from N. ½ E. round northerly to N. ½ W., and from N. ¾ W. round westerly to N. by W. ¼ W.

178.—SOUTH AMERICA.—*Magellan Strait.*—*Position of Crooked Rock.*—This rock (marked by kelp) has 8 feet water on it, with from 4 to 6 fathoms at the distance of about half-a-cable on its east and south sides, and lies with the following bearings and distance, viz.:—North extreme of Little Borja island (distant 7 cables), in line with south extreme of Big Borja, N. 57° E.; El Morion bluff, S. 68¼° E.; Cape Quod, S. 82¼° W. Position, at. 53° 32′ 20″ S., long. 72° 35′ 25″ W.

Note.—The summits of Little Borja and Big Borja islands, in

line, bearing N.E. ½ N., lead about 2 cables south-eastward of Crooked rock. *Variation*, 22° E.

179.—South America.—*La Plata.—Entrance to the Uruguay.* —The only channel for vessels of heavy draught is that between Martin Garcia and Santa Anna banks. The channel south of Martin Garcia bank is no longer available for vessels drawing 12 feet and upwards.

180.—Newfoundland. — *South Coast.* — *Lamelin Harbour.— Light on Allan Island.*—Established on 1st May, 1879, from a small octagonal light-tower recently erected on the south-east point of the island. It is a *fixed white* light, elevated 64 feet above the sea. The lighthouse, constructed of wood, is painted red and white. Position approximate, as given, lat. 46° 51′ N., long. 55° 47′ W.

181.—Newfoundland.—*South Coast.—Hermitage Bay.—Lights on Pass Island.*—On 1st May, 1879, two lights, placed vertically, were exhibited from a lighthouse recently crected on the island. The high light is *fixed white*, elevated 281 feet above high-water, and visible 19 miles. The low light is *fixed red*, elevated 267 feet above high-water, and visible through an arc of 136°, or between the bearings S. 76½″ E. and N. 32½° W. (covering the area included between the shoal ground off Wolf rocks, and Basse Terre point). The reef near Wolf rock is distant from Pass Island about 1¼ miles. The lighthouse, with dwelling attached, is constructed of wood, and painted white. Position approximate, as given, lat. 47° 29′ 15″ N., long. 56° 12′ W.

Note.—These two lights appear as one light at the distance of 4¼ miles. *Variation*, 28½° *W.*

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1879.

No. 7.—North Sea Pilot, Part III; information relating to Tees river, east coast of England.

No. 8.—Africa Pilot, Part III.; information relating to Pemba island and the adjacent coast between Tanga bay and Chala island, with directions for Pemba channel.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, IN MARCH AND APRIL, 1879.

1845	Bay of Bengal:—Entrance to Maulmain (*Salween*) river, and Amherst roadstead	1	6
668	Africa, east coast:—Lamu, Manda, and Patta bays and approaches	1	6
1314	South America, west coast:—Valparaiso bay ...	1	6
852	United States, east coast:—Sapelo sound to St. Andrew sound	2	6
853	United States, east coast:—St. Andrew sound to St. John river	2	6
1192	England, east coast:—Hartlepool to St. Abbs head	2	6
288	Newfoundland, east coast:—Toulinguet harbours ...	1	0
661	Africa, east coast:—Kilwa Kisiwani (*Quiloa*) ...	1	6
1539	Ireland, west coast:—River Shannon, Sheet VI. ...	2	6

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME, 1879.

(*This List is completed to the* 18*th of each Month.*)

243. *George*, brigantine; wood; built in France, 1858 owned by Mr. Thos. Moy, of Colchester; tonnage, 100; Colchester to Middlesbro'; ballast; lost on the Yorkshire coast. March 20, 1879. Inquiry held at Greenwich, before Balguy, Stip. Mag.; Forster and Parfitt, N.A. Accident due entirely to the default of the mate for neglecting to use the lead as ordered by the master. Certificate suspended for three months.

257. *Expert* and *Countess of Durham*, s.s.; the former a fishing cutter on a fishing cruise. The latter, iron; built at South Shields, 1855; owned by Mr. H. T. Morton, of London; tonnage, 420; Sunderland to Aberdeen; coals; in collision off Stonehaven, January 25, 1879, whereby three lives were lost. Inquiry held at Stonehaven, April 5, 1879, before Rothery, Wreck Commissioner; Aplin and Ward, N.A. Master of *Expert* to blame for failing to carry a light as required by the regulations. Mate of the *Countess*

of Durham to blame for not having a proper look-out kept, and for not keeping out of the way of the *Expert*. Certificate suspended for six months.

258. *Denmore*, s.s.; iron; built at Aberdeen, 1878; owned by Mr. A. Nicol and others; tonnage, 212; Leith to Aberdeen; flour; lost on May island, Firth of Forth, March 20, 1879. Inquiry held at Aberdeen, April 7, 1879, before Rothery, Wreck Commissioner; Aplin and Ward, N.A. Master in default for navigating his vessel without making allowances either for wind or tide and for not attending properly to the steering. Certificate suspended for three months. Recommended for one as mate.

263. *Ruby*, s.s.; iron; built at Hull, 1874; owned by Mr. Cory and others; tonnage, 187; Caen to Newport; ballast; lost on the Tuskar Rock, off Porthcawl, April 2, 1879. Inquiry held at Cardiff, April 23, 1879, before Rothery, Wreck Commissioner; Visconti and Jones, N.A. Master to blame for attempting to pass through a narrow passage with which he was totally unacquainted, and for running his ship on a course, on a dark and misty evening, which he must have known would lead to danger. Certificate suspended for six months. Recommended for one as mate.

264. *Leading Star*, cutter, and *Constance*, s.s.; the former a pilot cutter lying at anchor near the entrance of the River Avon. The latter, iron; built at Pointhouse, 1872; owned by the Bristol Steam Navigation Co.; tonnage, 563; in collision at the mouth of the River Avon, April 3, 1879, when one man was drowned. Inquiry held at Bristol, April 30, 1879, before Rothery, Wreck Commissioner; Pickard and Parfitt, N.A. Collision due to want of a proper look-out on board the *Constance*, or to that vessel steering course dangerously close to the cutter. Master to blame. Certificate suspended for six months. Recommended for one as mate.

265. *Buteshire*, s.s.; iron; built at Port Glasgow, 1877; owned by Mr. J. Turnbull and others; tonnage, 871; damaged by an explosion which occurred on board on April 12, 1879, by which one life was lost. Inquiry held at Cardiff, April 26, 1879, before Rothery, Wreck Commissioner; Visconti and Jones,

N.A. Casualty due to accumulation of gas in the empty spaces in the 'tween decks, probably ignited by a spark from the funnel. No blame attached to either master or owners.

415. *J. H. Lorentzen*, s.s.; iron; built at Sunderland, 1872; owned by Mr. Barwick and others; tonnage, 567; Rochester to Sunderland; ballast; lost on Whitby Rock, March 12, 1879. Inquiry held at Newcastle, April 1, 1879, before Rothery, Wreck Commissioner; Aplin and Castle, N.A. Casualty due to the vessel refusing to answer her helm in consequence of the wind and tide. The master did all in his power to avert the catastrophe, but without avail. Certificate returned.

417. *Edinburgh*, cutter, *Severn*, s.s.; the former a pilot cutter, belonging to the Trinity House, of 62 tons, cruising off Dungeness Point; the latter built of iron, owned by the Royal Mail Steam Packet Company; tonnage, 1,149; Hamburg to Southampton. In collision off Dungeness, March 14, 1879, whereby loss of life ensued. Inquiry held at Westminster, March 26, 1879, before Rothery, Wreck Commissioner; Aplin and Castle, N.A. Casualty caused by the want of a look-out on board the *Severn*, her helm being starboarded instead of ported; and by neglect to stop and reverse her engines. Second mate of the *Severn* to blame. Certificate suspended for six months.

418. *Memphis*, s.s.; iron; built at Dumbarton, 1871; owned by the Mississippi and Dominion Steamship Company; tonnage, 1595; stranded in Corunna Bay, February 25, 1879. Inquiry held at Liverpool, April 9, 1879, before Raffles, Stip. Mag.; Harris and Powell, N.A. Casualty caused by the master having mistaken an unusual light on shore for St. Antonio Light. Master and officers acquitted of default.

Official Inquiries Abroad.

246. *Southminster*, ship; lost near Cape Campbell, New Zealand. Inquiry held at Wellington, December 9, 1878. Loss attributable to the existence of a flood tide on the coast, whereas it is stated in the Admiralty Chart that *there is no tide*. Master's certificate returned.

250. *Blackwall*, schooner; stranded at the entrance of Bellinger River. Inquiry held at Sydney, January 13, 1879. No evidence adduced on which to found a charge against the master.

251. *Mariano*, barque; lost on Butcher Inlet, December 23, 1878. Inquiry held at Cossack, West Australia, January 2, 1879. No blame attached to master.

252. *St. Kilda*, schooner, and *Sea Gull*, barque; in collision on December 27, 1878. Inquiry held at Melbourne, January 23, 1879. Accident caused through the non-observance of Article 12 of the Steering and Sailing Rules by the master of the *Sea Gull*. Certificate suspended for twelve months.

253. *Tubal Cain*, fore-and-aft schooner; lost on the Ono Group, Fiji Islands, October 27, 1878. Inquiry held November 28, 1878. Casualty due to an error of judgment on the part of the master, who was severely censured.

255. *Runnymede*, barque; lost on a reef N.E. of Browse Island, December 22, 1878. Inquiry held at Sourabaya, February 6, 1879. Accident caused by the parting of her cable whilst at anchor. Master free from blame. Mate censured.

256. *Acacia*, barque; put into Algoa Bay leaky, having experienced severe weather, January 18th, 1879. Inquiry held at Port Elizabeth, 8th February, 1879. Master exercised sound discretion in making for a port of shelter.

259. *Suliote*, ship; Naval Court held at New Orleans to inquire into the cause of the fire on board, when it was decided that there was no blame due to the master. Certificate returned.

260. *Laura Gertrude*, schooner; lost on a reef near Bera-berahan Island, December 26, 1876. Inquiry held at Singapore, February 26, 1879. Master drowned. No blame attached to mate.

261. *Scottish Bard*, barque; stranded on Swain Reef, January 19, 1879. Inquiry held at Rockhampton, Queensland, February 10, 1879. Master and mate guilty of negligent navigation. Certificates suspended for six and three months respectively.

262. *Pride*, schooner; lost on Riding Rocks, Watling Island, December 22, 1878. Inquiry held at Nassau, February 25, 1879. Master guilty of great carelessness, in leaving the vessel in charge of a mate of whom he knew nothing.

264. *Julia Percy*, s.s., and *St. Joseph;* in collision near Port Phillip Heads, January 31, 1879. Inquiry held at Melbourne, February 10, 1879. Casualty due to an error of judgment on the part of the master of the *Julia Percy*.

266. *Alice Platt*, barque; stranded off Kingscote, Kangaroo Island, February 9, 1879. Inquiry held by Marine Board of South Australia. Casualty caused by the navigation being entrusted to an inexperienced person, namely, the second mate, and he was severely censured.

267. *Clara*, schooner; lost on outlying dangers to the southward of Pulo Bintang, January 20, 1879. Inquiry held at Singapore, February 11, 1879. Master committed an error of judgment, and was admonished to be more careful in future.

268. *La Perouse*, schooner; abandoned at the mouth of Clarence River. Inquiry held at Sydney, January 20, 1879. Casualty attributable to the vessel springing a leak. Master free from blame.

269. *Ardenlea;* Naval Court held at New Orleans to enquire into the cause of a fire which took place on board, March 18, 1879, whilst lying in port. No evidence adduced to show how the accident occurred. Master not to blame.

270. *Ballina*, paddle-steamer; lost while leaving Port Macquarie. Inquiry held at Sydney, March 3, 1879. Accident caused by the very heavy sea which was running. No evidence on which to found a charge against the master.

271. *Raymond*, brig; lost near Cape Hawke. Inquiry held at Sydney, March 3, 1879. Loss occasioned through the vessel springing a leak, necessitating her being beached. Master not to blame.

272. *Kerangie*, s.s.; lost on a reef off Cape Everard. Inquiry held by the Victoria Steam Navigation Board. Casualty due to vessel proceeding at full speed in a dense fog. Certificate of master suspended for six months.

273. *Sir Charles Napier*, ship; lost at Ascension Island, March 18, 1879. Inquiry held at Ascension, April 2, 1879. Accident due to want of precaution in not using the lead. Certificate of master (who was intoxicated) suspended for twelve months.

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NAVAL TACTICS.

WE are justly proud of the numerical strength, and what may be called, the material efficiency of our fleet. It is unquestionably stronger than not only that of any single foreign power, but also than those of several combined. In equipment it is certainly second to none, and greatly superior to many. It would be shameful were it not so, considering the wealth and mechanical skill of the country. We may, therefore, at least claim the credit of having availed ourselves fully of the resources of the Empire which facilitate the maintenance of a numerous and well-found Navy. Our seamen are highly trained; if the time and money expended on their instruction be taken as the criterion, they are more highly trained than those of any Navy in existence. We educate them from boyhood, not merely a small fraction of them who may form a *corps d'élite*, and supply us with future petty officers and warrant officers, as the other maritime States of the world are content to do, but the whole body of blue-jackets. We keep up great establishments for the extension and completion of this training, and we have recourse to all sorts of inducements, pecuniary and other kinds, to lead our sailors to become proficient in knowledge of the special duties which they are or may be called upon to perform.

We have thus done a great deal to foster and preserve those seamanlike qualities which are properly regarded as essential to maritime pre-eminence, and which the new conditions of a seafaring life seem likely to impair. We have tried, with considerable success, to make up for the absence of that familiarity with the varying circumstances of navigation, which was caused by the long and tedious voyages of the days of sailing vessels, by a more exact system of instruction than was ever dreamed of in those days. We have gone a long way in improving discipline, and have rendered it more uniform throughout the service ; we have modified the severity of the ancient code and rendered the action of the new laws more equal and less uncertain. For this and the improvements in the education of our men we have been rewarded by a perceptible and very important elevation of their *morale*. We have not neglected the training of our officers ; and educational facilities offered to those of all ranks now, and the educational tests to which the juniors are put at the present day, constitute an immense advance beyond what was considered educationally adequate only half a generation ago. In fact, in most particulars, we have enormously raised the standard of efficiency in the Navy. We have introduced system where none existed before, and organisation where chaos reigned hitherto. Taken as units of our force it would be, perhaps, difficult to surpass the efficient state of our individual ships even in the future ; in the past it has certainly never been equalled.

There is, however, one blot in this bright picture which seriously detracts from its excellence as a whole. To use the phraseology of a service better understood and more widely known—even by this maritime nation—than the Navy, it may be said, that the sea service at present resembles an army composed of an aggregate of splendidly organised and highly trained regiments, all glorious in their equipment, which are quite without any knowledge of the methods to be employed in encountering an enemy in battle. Mere perfection in drill, and intelligence in the performance of certain formal peace manœuvres, are very inadequate qualifications for engaging in actual combat, if all knowledge of tactics be absent ; yet this is very much the case of the British Navy at the

present time. The officers readily admit it, and complain of the obstacles in the way of their remedying of their own accord, as they are quite prepared to do, this very serious defect. They make no secret of the ignorance of even the most rudimentary principles of naval tactics which is so widespread in the service. No naval officer disputes the fact; some think that this state of things can hardly be altered; some, perhaps, that it is not important that it should be; others, the majority fortunately, that it is both capable of being changed for the better and that such change is urgently wanted. The public, it need hardly be said, are deeply interested in this matter. It may well be asked, why should we pay so heavily for a naval protection, which, excellent as it may be in many particulars, has this fatal defect. Can it not be remedied? Does the history of our Navy in former days give us any reason for hoping that it can be?

To the last question it may be answered, that the history of not only our own Navy, but that of all other navies which attained any importance in the world, from the most ancient times downwards, has shown that tactical efficiency and naval success went hand in hand, and that the absence of the former led assuredly to the want of the latter. It would not be necessary to draw upon the naval annals of a time anterior to that at which the English Navy began to make a name for itself to show how truly this is so. The principles of naval tactics of the more modern type first began to be understood in the second half of the seventeenth century. The build, rig, and armament of line-of-battle-ships and frigates were then fixed on the system which was retained essentially till the vessels were superseded, in our time, by the armour-clad and the iron-hulled cruiser. The fleets of the seventeenth century were, numerically, far stronger than those which have been taken into action since. The ships comprising them were always to be counted by the score, and occasionally exceeded a hundred. The field of battle was the comparatively narrow Mediterranean, amongst its islands, or the absolutely contracted English Channel, then more generally known as "The Narrow Seas."

The object of naval architects in designing a fighting ship was

to get as many guns, of what was then considered the proper calibre, mounted on board, as she could carry. Those were necessarily mounted in greatest number on the broadside. As the ship obeyed no motive power but the wind, acting through the medium of her sails, and as these and her rigging were likely to be soon damaged considerably by the fire of an antagonist, it may be, and was generally assumed that—when once the battle was fairly engaged — she would be stationary. Hence the combat became as a rule one of artillery. The capital tactical manœuvre was therefore to get the broadside guns to bear at the proper distance. The principle was perceived, and acted upon, and till the use of steam became general, it was, with great propriety, held to be the first object of a captain to place his ship so that he might make the best use of his most important armament. The main object of tactics, then, was to get "broadside-on." As both sides aimed at this, actions usually took the form of an exchange of cannonades by combatants lying parallel one to another. The one who pounded hardest gained the day. If the broadside could be opposed to the bow, or still better to the stern, of an enemy, a higher tactical object was attained. There was no fear of being rammed, for the enemy was motionless; whilst he could make use of but a few guns, mounted at one extremity of his vessel, to reply to the whole broadside—probably a dozen times as many—of his assailant. The latter "raked" him fore and aft, without receiving any very heavy fire in return; and if the ships eventually got close, as they probably would in time from the forging ahead of the one that was being raked, the additional chance remained of carrying her, her crew being greatly weakened by the raking fire, by boarding.

To bring a great fleet into action where there was but little space for manœuvring—not that much manœuvring would have been practised, even had it been possible—and where the broadside position was recognized as permitting the fullest use of the armament of each particular ship, the one thing deemed necessary was to place it on a line parallel to that of the enemy, at a suitable distance from him, to allow the guns to be used with effect. Each ship selected her antagonist in the hostile force, the admirals

choosing those of equal rank with themselves, and the pounding began. When a ship on either side was destroyed, and seldom till then, her antagonist joined a consort in overwhelming the foe by their united fire.

These tactics, though evidently imperfect and incomplete, were not erroneous. They permitted the most advantageous development of such offensive power as ships were then endowed with. Their weak point was their failure to recognize the advantage of concentrating overwhelming force upon a portion of the enemy's fleet. When practised by resolute men, against enemies who were content with simply doing the same thing, they were fairly successful. They, at all events, recommended themselves to the authorities so far, that a definite formation for the "Line of Battle" was made obligatory, and "Fighting Instructions" of a very precise kind were issued by our Admiralty. It happened, however, that the seamen of France, whom we were destined to contend with most frequently, began to study the principles of tactics, and they soon discovered that to adhere to certain formations and always to execute certain manœuvres was to play the game of the enemy. They accordingly got into a habit of frustrating our precise evolutions by simply declining to wait for their completion, and though they did not succeed in defeating us, they prevented our defeating them. This happened over and over again during the greater part of the last century; and admirals were "broke" and even shot by sentence of courts-martial, nominally for not defeating the enemy, really for too implicitly obeying orders as to the tactics to be adopted in action.

Students of tactics, like Clerk of Eldin, might lament that our officers cared so little to study them, and that these courts-martial had been the cause of all our "naval mis-carriages;" but no change was made till Rodney won his great victory over De Grasse. That ushered in the new epoch which was to be illustrated by the triumphs of Nelson. The broadside position and the "line ahead" were not abolished, but they were left to supplement movements and formations of greater importance and more in accordance with true tactical principles. The brilliant engagements

of the period, which Rodney began and Nelson ended, proved the error of drawing a hard and fast line in fighting instructions. And it has apparently been the doctrine of Whitehall ever since, not to attempt to insist upon any particular manœuvres or formations. No doctrine could be more sound. And had the marine steam-engine never been invented, the art of gunnery not advanced, and the armour-clad proved an impossibility in naval architecture, there is no doubt the British fleet would be as tactically efficient as it is numerically powerful. Unfortunately these things have introduced an entirely new set of conditions, and the tactics of the Nelsonian period have become as much things of the past as the ships and the weapons with which they were carried out. Still more unfortunately, no well-sustained attempt has been made to supply their place.

Everybody recognises the enormous change which has been wrought in naval warfare; everybody allows that the lessons of former times convey but little information to us now, and yet, no one can say that proper steps have been taken to ascertain what will be really required of our ships and fleets should they ever have to go into action. The conviction that the instructions of an earlier time were responsible for so many "miscarriages" seems to have taken such hold of the minds of the authorities, that they prefer now to leave things to chance, rather than insist upon proceedings which might result in failure. Yet it seems that there is a way out of the dilemma in which they have been placed. It would not be too much to expect that the capacities of our new armaments should be investigated more thoroughly than has yet been attempted. Instruction in tactical principles might be imparted to the officers of the Navy, who are certainly eagerly asking for it. The advantages and disadvantages of certain formations and manœuvres, under the probable circumstances of a naval action might be inquired into and stated; though the adoption of any particular one, or set of them, need not be made compulsory. As the Admiral, who was in the chair at the United Service Institution at the last discussion of this subject, remarked, some use might be made of the large collection of facts about performances of ships which must be in the possession of the

Admiralty. From it, it is possible, some useful conclusions might be arrived at; at all events, officers in command would have a chance of forming an estimate of the capabilities of their ships. It may be asked also, why the promised instruction in tactics to be found in the programme of studies to be pursued at Greenwich has never been given? Everybody is agreed that it is necessary, the insertion of it in the published *curriculum* acknowledges the propriety of providing for it, yet no proper attempt is made to give it. There can be little doubt that the efficiency of the Navy can never be what it might be, so long as so important a matter as the study of naval tactics is altogether neglected.

ON SICK SEAMEN ABROAD AND AT HOME.

AS the Civil Service Estimates have recently passed under review this Session, and have occasioned the usual promiscuous and desultory discussion in the House of Commons, we are reminded of an annual charge which, though a heavy and increasing one, seems, as far as we have observed, to have passed this year, as on former occasions, unchallenged. We allude to a sum of from £30,000 to £40,000 for the cost of sending home, from foreign ports, those seamen who become sick, disabled, and consequently helpless abroad. A Parliamentary paper, headed "Merchant Shipping," recently published at the instance of Mr. John G. Talbot, Parliamentary Secretary to the Board of Trade, shows that the sum voted for this purpose in 1855-56 was £17,000, of which £8,662 only was actually expended. Since the above date, the amount asked for and spent has varied somewhat, but has altogether increased progressively. In the year 1866-67 it reached its maximum of more than £47,000; in 1868-69 and the following year, £38,427 and £37,059 were expended, and the sum spent last year amounted to £31,612. This is, undoubtedly, a very large sum to spend upon a class of men who are now for the most part earning good wages, are well fed, and with some notable

exceptions, not, as a rule, very hard worked. For although in many cases under-manning is still, unfortunately, the rule, so large a proportion of the foreign trade is now carried on by means of steam vessels that, taking all circumstances together—among which we must include shorter voyages, better rations, and better accommodation—we must inevitably arrive at the conclusion that the preventible sources of illness (though, perhaps, not of injury) afloat have, during the period above quoted, lessened very perceptibly, and other reviews of official statistics tend to strengthen this opinion. For by referring to the annual statement of the navigation and shipping of the United Kingdom for the year 1878, published two or three months ago, it is seen that as regards the foreign trade during the last five years, the number of men and boys employed has actually decreased, the whole being, in 1874, 140,516, and in 1878, 135,994 persons; but the sum expended in affording relief during the five years under consideration has remained almost stationary, indicating the amount of sickness during that period to have been greater than usual. We do not care to pursue statistics further, because it is said that the numerical aspect of a subject is never free from fallacies. Be this as it may, we think that few who have any knowledge of the subject will fail to see and to admit the existence of an evil in the administration of this section of Imperial work—an evil, too, which, to some extent, ought to be remediable. That is to say, is it really necessary that the country should be taxed to the extent of some £30,000 annually to assist a particular section of the working community? and if not, what is the remedy?

Before replying to either of these questions, we may, by way of assistance, refer to another Blue Book just issued, which bears directly upon the same subject, and out of which, if the same line of action is pursued (*i.e.*, of shutting the door when the horse is stolen), we can see looming, in what may be called the immediate distance, an additional annual increase to the sum above quoted. The Returns referred to relate to "Hospitals in Foreign Ports," and form the continuation of an official paper on the same subject, published in the Session of 1877. Both these reports arose out of a memorandum issued on hospital accommodation for British seamen at foreign ports.

Such ports may be divided into (1.) ports where there is no hospital for seamen; (2.) ports where there is a native hospital for seamen; (3.) ports where the hospital used by foreign seamen is a foreign hospital. At places classed in the first division, private practitioners must be employed, whose charges are high, and whose skill is sometimes not superlative, so that, practically, at such places a great deal of money is spent, and perhaps wasted, on medical attendance, whether the charges come out of the pockets of the shipmaster or the seaman. In places classified in the second division, the system is unpopular, and generally unsuccessful. British sailors, if ill, dislike intimate association with foreigners, and the diet, accommodation, and general arrangements are always objectionable, and sometimes repulsive even to our seamen, so that no one goes to hospital if he can possibly avoid it, and thus conceals his illness until it has assumed a serious if not a hopeless aspect. As regards the third class, there are a few places that have hospitals somewhat under the protection of the British Government, and at some of these places a tax has been levied, which appears in all cases to have been successful. In Turkey, where Her Majesty has jurisdiction, hospitals for British seamen can be established, and a tax levied on all British ships that frequent the port for the maintenance of the institution. Constantinople and Smyrna both have hospitals on this principle, and we can speak from personal experience as to the admirable way in which they are administered, and the cordial way in which they are appreciated by our own sailors. The want of hospitals at foreign ports much frequented by British ships is one that no one officially or commercially connected with the places in question attempts to dispute. In some places, notably at Cronstadt and Buenos Ayres, the difficulty has been met by the efforts of influential British residents, principally merchants, who have supplied contributions, and by their exertions kept a small hospital in fair working order. At some few places small grants have been made to foreign hospitals by our own Government, but on account of the reasons above given, with no sound or permanent success. As a natural consequence, numerous applications from our consuls and others have been made to the Foreign Office and the Board of Trade, detailing the evils that

exist, and the necessity that continues for the maintenance of a small hospital at each of these ports, on a plan similar to those at Constantinople and Smyrna.

We may now conveniently revert to the two questions propounded above. First, as to the necessity for these hospitals. As facts are usually better than opinions, we may quote the evidence of Dr. Patterson, for some years resident surgeon and superintendent of the British hospital at Galata, dated 31st December, 1878. The report from which this evidence is gleaned was enclosed by Consul-General W. Fawcett to the Foreign Office, and the writer, after epitomizing the expenditure, &c., of the establishment, says: "I write to state *again* the fact of the large amount of syphilis prevailing among seamen arriving here from British ports, and the really filthy state in which men come to hospital," on account of the absence of any arrangements to promote and preserve cleanliness. After commenting on a peculiar class of disease that seemed to arise solely from the defects of some British steamers chartered as Russian transports, Dr. Patterson says, "The rule is that seamen coming to this port are physically below par, and are slow to recover from either disease or injury." He concludes a very able report thus: "I think it my duty to state these facts and opinions for the information of Her Majesty's Government, with a view to future legislation on the subject, as more or less for twenty years my duties have brought me into close contact with seamen, and I have been struck with the marked deterioration in physique and greater proneness to certain forms of disease, especially since the introduction of screw steamers into the Levant and Black Sea trades, and that I attribute much to the lack of means for keeping their skins clean."

The same sort of evidence has frequently been recorded by the professional officers of the Dreadnought Seamen's Hospital at Greenwich, the wards of which institution accommodate about 300 sick seamen, at least 25 per cent. of the cases being of a chronic kind; about 80 per cent. of these having been sent home from abroad at the public expense, having in fact done little or no work since they signed articles, and sailed from the United Kingdom months before. There can be no possible doubt as

to the necessity for hospital accommodation at foreign ports, as long as ships are permitted to go to sea with a varying percentage of their crews physically incapable, and it appears to us too, that so long as the Government do not think it desirable to interfere with the liberty of the subject in this respect, so long is it their duty to assist in providing this hospital accommodation. For by so doing, they would undoubtedly in some measure diminish the large sum now paid for the conveyance home of incurably sick sailors who, on their return, are thrown upon the funds of such charitable institutions as the *Dreadnought*, and subsequently upon the public rates.

The printed correspondence to which we have already referred shows, however, a marked reluctance on the part of the Board of Trade to render the aid requested. As regards the port of Callao for instance, the acting consul reported in 1878 most emphatically as to the benefit that had accrued in consequence of the appointment of a medical inspector, whose services were utilized in connection with the hospital. But the Board at Whitehall declined to sanction any further payment to this officer after March of last year, so that, as far as we know, the office has now ceased to exist, and the treatment of British sick seamen at that port is attended with the old routine expenses. The practical consequences are in most cases that, having spent all his money in unsatisfactory medical advice and very indifferent nursing, the sailor is sent home by our consul in a state of beggary, twice as much probably having been spent on him as was required, and with these unhappy results. We are not aware, nor do the papers before us assist to determine, whether any obstacle exists in countries other than Turkey to the principle of compulsory taxation of British vessels for hospital purposes; and, indeed, it appears doubtful if the Foreign Office or the Board of Trade have made any systematic inquiries as to the matter. The Tenth Annual Report of the Committee of the Seamen's Hospital at Cronstadt, which is supported by voluntary rates levied on British steam and sailing vessels, and by subscriptions from the residents, shows how satisfactory the system appears to work. The Committee is composed of the British Consul and Vice-

Consul, the Chaplain to the Russia Company, and the Physician to the Embassy, together with six or eight leading commercial residents, and as many commanders of British merchant vessels trading regularly from our north-eastern ports to Cronstadt. During the year 1875 (the last report received), 152 in- and 842 out-patients were treated in the institution, at a total cost of 13,801 roubles (about £1,552); this being slightly in excess of the contributions. A total of 43 in- and 105 foreign out-patients were treated, all these having been sent from British vessels, and the contents of the Report appear to indicate that the establishment is conducted efficiently, though for reasons that no doubt the respective Consuls could supply, the cost of maintenance at the hospital in Constantinople is somewhat less per head than at Cronstadt.

Is there an insuperable obstacle in these ports to the plan of adding to the general native hospital a ward for British seamen, to the maintenance of which shipmasters should be invited to contribute, and which should be under the professional control of the English physician, where there is such an individual resident? Much expense would be spared by the adoption of such a plan, and except as regards nursing and food, two very important matters, by the way, the details need not be either complicated or difficult of elaboration. But this plan does not seem to have been suggested, although the Board of Trade, some nine years ago, appear to have sent out one of their Whitehall staff to Callao, Valparaiso, and other places for the purpose of sifting the merits of this question.

But, as indicated above, it seems to us that the Government are in this action permitting a remediable evil to continue, without at all attempting to remedy it. Meanwhile, why should the evil, if really remediable, wholly or in part, exist? It must surely be granted that with figures before us, compiled during the last ten years, the number of sick seamen left in hospitals abroad would be greatly diminished if vessels started from our shores with sound and healthy crews, for it is the chronic cases of consumption, ulcers, heart disease, &c., and not those of acute disease or of injury, that fill the wards and swell the expenses.

It is plain, therefore, that to combat this hospital question, and at the same time cut down this heavy annual charge of £30,000 or more spent in sending those unfortunate creatures home, we want to go to the root of the evil, and endeavour to prevent all seamen manifestly unfit, from signing articles or going to sea at all. We are told that the system of inspection would not answer, because the men would not submit to it, because when the market was, so to speak, not glutted with men, vessels would be positively stopped for want of hands, if none but very good lives were accepted; because, between the date of signing and of joining, a man might, and often does, become diseased, especially with venereal; and because neither the Government nor the shipowner is willing to bear the cost. We have been at much pains to sift these objections as they have severally arisen. The first and second are purely theoretical. As regards scarcity of men, and the refusal of this person or that, any inspector who knows his work would permit a man, say, with incipient consumption, to go for an Australian or a Cape voyage, but would decline him for a Baltic or North Atlantic trip; will accept one recovering with West Coast fever for the northern ports or for the States, but decline him for India or the West Coast of Africa; and so on. As to the risk of illness between the date of signing and joining, as we have before insisted on, it is the chronic and not the acute malady that the shipmaster has to fear, for it is the old invalid with his cough, his rupture, and his rheumatism that cripples the work, and endangers the safety of the vessel. And as to the paying part of the matter, it must be plain to all concerned that the aspect of the entire subject is almost wholly commercial. The scale of the Board of Trade at present for permissive inspections under the 10th section of the Merchant Shipping Act of 1867, is 2s. 6d. per head. If (which is very problematical) really competent medical officers can be found to undertake the duty at this rate, the cost for each voyage would be, say, from £2 to £12 for every ship, the average being £5 or less, inasmuch as the latter sum would cover the inspection of forty men. In no case would *all* the crew need inspection, and our readers can best judge how many vessels, of any class, leave the United Kingdom for "foreign" with more

than that latter number (exclusive of officers) on the articles. And who can deny that this scale of expenditure would save thousands of pounds now lost in wrecks and drowning, in hospital treatment abroad and at home, and in the sum spent as explained above for the transit and maintenance of sick seamen. Our readers may put aside for the nonce the humanitarian, and keep entirely to the financial side of the subject, for that after all is the only practical view to take in dealing indifferently with all kinds of men, and in this aspect it appears certain that it is economy to adopt the plan above urged. It has cropped out in both Houses whenever Merchant Shipping Bills and Acts have been discussed, and perhaps, strange to say, has been urged more by the economists and so-called "screws" among the shipowning interest than by the Liberal section; because the former know that the plan will benefit their pockets, and at the same time credit them with humanitarian principles, for taking care that the poor sick sailor shall *not* go to sea!

THE PROPOSED PANAMA CANAL.

MANY years since, when the promoters of the Honduras railway were inducing the country to believe that the two oceans could be easily connected by a railway through that defaulting State, the writer of this paper warned his countrymen in the pages of a popular magazine that it was a commercial impossibility. The charm of a prospective ten per cent. was, however, too great to be resisted by the classes from whose ranks land pirates reap their greatest harvests, and so the hard-earned savings of the needy half-pay officer, the country clergyman and the widow went to swell the coffers of the speculator and to transport a certain amount of railway plant into the inhospitable swamps of Central America.

For years previous to this epoch enthusiasts had endeavoured to impress on the world the feasibility of connecting the Atlantic

and Pacific by the River San Juan and the lakes of Grenada. Prospectuses were drawn up between the representatives of Costa Rica, Nicaragua, and the promoters of the scheme, wherein it was duly shown what a certain road to riches and usefulness the contributors would enter on. At the time we write of, the harbour of St. Juan de Nicaragua, or Grey Town, as it had been just named in honour of the Governor of Jamaica, carried twenty-two feet or more over the bar, and when within the water was as smooth as a mill pond, even during the heaviest northers. The shelter was made by the deposit of silt from the river and sand from the ocean, and a great part had become so consolidated, that the plaintain, the pumpkin, and various species of vegetables were grown by the workmen connected with the small line of steamers plying between the lake of Grenada and Grey Town. These steamers were flat-bottomed stern wheelers, a mode of propulsion which the Americans had long since adopted on many of their rivers, not only for handiness, but for the protection afforded by the hull to paddle floats and periphery. Their draft, when laden, was only eighteen inches, so that unless the river happened to be unusually low, the ranges of rapids which mar the river between the lakes and its mouth could generally be crossed.

In 1856 a British squadron, consisting of the *Arrogant*, 46 gun screw frigate, *Tartar*, *Cossack*, and *Archer*, corvettes, and three despatch vessels, were anchored in the harbour at the same time, and there was still an amount of space for ordinary merchant ships whose draught of water did not exceed fourteen feet. Had this port rested on a secure foundation it would have undoubtedly risen into importance, for those pioneers of modern enterprise in the Caribbean sea, the Royal West India Mail Company, had made it a regular port of call for their steamers, and the Americans also had a regular line in connection with the river boats, so that goods were carried from the States to Grenada with only a single transhipment.

During the long sojourn of the squadron and for many months afterwards, some sixteen in all, no marked change took place in the depth of the water in the harbour, but there were evident signs that a norther of unusual force might at any moment breach

the treacherous rampart which a loose deposit had made. The contour of the face bordering on the sea would change its outline during every gale, and on one occasion actually opened a gatway through which a sloop might sail from the sea to the inner harbour. The residents on the spit were a little troubled at this rude warning for the safety of their houses and workshops, but had no conception that later on the port would practically cease to exist. Fortunately, when the crisis came, there was only an Italian brig within the bar, which shoaled from twenty-three to two feet in a short period. The crew of the brig remained by her for nearly two years, but in the end abandoned their charge as hopeless. Subsequently the United States Government sent a surveying ship to make observations on the coast, and to sound the bar. In carrying out this service a very able officer belonging to their navy and his boat's crew were upset in the surf, notwithstanding the care they exercised, and nearly all perished. From that time the impracticability of making this port one of the termini of their proposed great enterprise appears to have been very wisely abandoned, for it is not too much to say that if engineering skill had blasted a channel through the successive ridges of rocks which form the rapids of the San Juan, and cleaved a passage through the mountainous country which intervenes between the lake and Realjo, their enterprise would have been rendered nugatory by the ever changing deposits which accumulate at the river's mouth from the freshets and the upheaval of sand by the ocean. The current is always outwards, the dark yellow of the river showing that a large amount of sediment is only held in suspension until it reaches slack water at some distance from the land. Thus are formed large islets of verdure tenanted by numerous snakes, one at least, the blood snake, being the most deadly known in the country. The writer had a narrow escape from one of these reptiles. The only source of amusement after dark was to take off shoes and stockings and paddle about barefooted on the sloppy decks. When sitting on a portsill in this fashion the master-at-arms came aft to report the rounds, and said, "Don't move, a snake is between your feet." On looking down, the light of his lantern showed the reptile coiled

up and apparently asleep. We gathered up for a spring, cleared the spot with a bound, and killed the reptile with a blow from a stop handspike. The next morning we showed the skin to a colonel of the Costa Rica army, and he informed us that a few days previously his orderly had died in great agony from the bite of one, and that his men always mustered on parade with a nut which is an excellent antidote to the poison. This nut is not unlike a nutmeg in size, colour, and shape, but even its native name has slipped from memory. However, the inhabitants have such a perfect confidence in the remedy that few attempt to penetrate into the woods without carrying a supply. From some unexplained cause the colonel's orderly had on that day left his in barracks, and the omission cost him his life.

It may not be out of place, even at this remote distance of time, to make a few comments on the climate, because projectors of great undertakings are too apt to omit this important factor from their calculations, often by such omission rendering the most elaborately formed plans of no practical value. Probably, owing to the dense vegetation, rain is of more frequent occurrence here than on any other part of the coast. We have an impression that during a sojourn of sixteen months, there were few days on which it did not fall, and that on leaving, the "oldest inhabitant," in reply to a question from an officer "When does the rainy season commence?" replied "I guess it is just about going to begin." It is well that rain is so frequent, for the damp heat after a few bright days becomes very oppressive. The mosquitos are more tenacious and bloodthirsty than those of any other part of the coast, rendering it almost impossible to go through the woods—we have fairly run out of them; and on the sea beach a more minute, but not less troublesome pest, the sand fly, attacks Europeans in the most persistent manner. With the exception of a few whose happily formed constitutions enable them to defy heat and cold, cholera, and fever, all foreigners suffer greatly from the latter, and its effects are so debilitating that a change of climate becomes an absolute necessity to restore health. In many instances a return to the country is followed by an immediate attack of fever, and so tenacious is its grasp, that it is not uncommon after a residence of

years in a temperate climate to suffer a relapse. We could quote many instances of this. No amount of care can prevent it; the strong and the weak alike suffer, and although it is not often fatal, the effects are lasting. With such a fact before us it is easy to infer that the construction of a great work entailing manual labour of the hardest nature under the most unfavourable circumstances, requires an amount of foresight and calculation to ensure success which cannot be estimated by engineers who are not familiar with the features of the country through which they would essay to make a cutting.

White men cannot labour in this climate, if exposed to the alternate changes of sun and rain, without contracting fever or dysentery, and in no instance was this truism more verified than in the fate which befel Walker's filibustering army. They ascended the San Juan strong and healthy men, and of the few who returned with the writer to New Orleans scarcely one escaped uninjured in constitution. Many died on the passage, notwithstanding the careful manner in which they were nursed by British seamen, for it was marvellous to note the callousness which disease and hardship had wrought amongst themselves. Occasionally one would hear, as the kind surgeon stepped along the decks (poor fellow, he was subsequently buried out of soundings), "I say Doc., I guess this man is dead; hadn't you jist better get him out of this." Possibly no stronger comment on the opinion then generally entertained of the climate can be found than in the first Memorandum of the English Commodore of the squadron alluded to, which contained a request that officers and men would subscribe for the purchase of a plot of land to form a burial ground. It was carried into effect, and we still have a sketch of the spot with its neatly kept graves.

From a careful consideration of the difficulties which would attend operations in Nicaragua, and the impossibility of forming a harbour at Grey Town, that route may be at once eliminated from the map.

Colon, or Aspinwall, as the Americans always term it, is, after Grey Town, the only route of whose facilities local knowledge enables the writer to bear testimony, and of this it may be said

that the probable cost of a canal could only be estimated by millions of pounds sterling. At present there is no harbour at Colon, although one could easily be made to accommodate a reasonable number of ships on the east side of the town. A pioneer of the railway once said that a lack of funds alone prevented them from commencing at the point indicated, but so doubtful were the public of the feasibility of the plan, that financial difficulties delayed the completion of the railway for some time, although its projectors never lost faith in their great enterprise.

The want of a safe port during the season of the northers is much felt, and has, through the demolition of wharves and destruction of produce, cost the Panama Railway Company hundreds of thousands of dollars. It is a grand sight to watch the big rollers coming in, extending, as they sometimes do, right across the bay. Fortunately they are not attended with much wind, or no ordinary vessel could safely ride at anchor or steam out, either of which is now possible by keeping on the western shore. When compelled to leave from this cause, ships generally seek shelter in the magnificent harbour of Porto Bello, some fifteen miles to the eastward, where the largest may safely lie within a few feet of the shore. This is the port mentioned in Eliot Warburton's charming work, "Darien," and his remarks on "the infernal climate" are not overdrawn, as it is hardly possible for a stranger to land there in summer without contracting fever. The ancient city, captured by Admiral Vernon, has been invaded by dense masses of vegetation until only a few houses built near the beach remain, but in going through the forest which now grows on its site, the ruins of churches and other edifices may be seen enveloped or rent by creepers and gigantic trees. It is interesting to note the progress of this destructive agency, which is begun by a seed falling on the roof; according to its kind it grows more or less until its weight causes it to break through tiles and rafters. However it may alight on the floor below there is no stoppage of growth, and the most massive masonry ultimately gives way to the silent forces of nature.

The fable of the Panama line of railway costing a life a sleeper may be briefly dismissed with Colonel Totten's remarks, "We could not

afford to keep labourers in hospital; you who are familiar with the country know that the fever is not often fatal, although debilitating, consequently when a man could not work he was shipped off to New York by the regular mail steamer." Amongst the Chinese coolies, one thousand in number, the mortality was great from disease and a suicidal tendency. It is alleged that scores died by their own hands, but the reason for this mania was never satisfactorily explained, for every care had been taken to supply them with their accustomed food and to give efficient shelter. Whether it is possible to devise means to reconcile this hard-working, peaceful race to the debilitating climate of the isthmus, time alone will show, but hitherto the attempt has been a melancholy failure. The only foreigner who stands the climate is the Jamaica negro, but he occasionally gives in to the "shakes," his ebon skin becoming of deep indigo tint. Apart from this he is the most unreliable and dissolute of his kind, spending in drink and debauchery earnings which, if husbanded with care, would soon enable him to realise an independence. The founders of the railway suffered greatly from such irregularities, and in the end their enterprise was completed by Carthagena men, who are more reliable than those of any other part of the coast. The proximity of the Panama railway to this route, if it should be deemed feasible, would give it an advantage over those where scarcely a mule path exists. The summit ridge between Colon and Panama is two hundred and eighty-seven feet above the mean level of the Atlantic, distant 37⅜ miles, and from the Pacific 10½ miles. Along the track of the railway the surface varies from marsh and swamp to stone of the hardest quality, much of which is quarried for building purposes as well as the ballasting of ships. That men and money would in time overcome the difficulties attendant on such a route is quite probable, but admitting that the trench had been cut through the land to Panama on the Pacific, a formidable reef bars the passage to deep water. Large ships anchor nearly two miles from the town and now have to discharge into lighters, which can only reach the terminus of the railway at high tide. It is said that it would cost £30,000 to blow up Daunts Rock, near Queenstown, which

is only a small patch, and, bearing in mind that the necessary materials and cheap labour are close to the spot, the idea of blasting a gatway through the reefs of Panama may be deemed impossible in a paying sense. There may be more highly favoured localities to debouch on, but whether there be or not it will matter little to the present generation, simply because they will not attempt the work. The great Frenchman who has earned immortality by connecting the Mediterranean and Red Seas must be content to rest on his laurels and leave the work in the new Continent to posterity. Possibly when the population of the world has so much increased as to demand its fulfilment, the man and the means for the enterprise will be forthcoming. We have had "kites" enough to last our time, railways commencing on the borders of civilization and running into the woods, national loans and railway loans, the majority of which have been dishonoured and the country impoverished to an enormous extent. Amongst these the Honduras loan stands conspicuous by its folly and the misery it has engendered in a very large number of once happy English homes. Country clergymen, widows, and several officers who weakly commuted their retirement, stand foremost in this unhappy group. The following copy of a letter from a sufferer will convey no mean idea of the mischief which has been wrought in the classes alluded to: "I hope the urgency of my case will plead my excuse for writing to you. I am the wife of Colonel ——, late of the ——, who, on his retirement, was induced to commute his pension, as he thought, for the benefit of his family; but he unfortunately invested the proceeds in the Honduras Railway, which proved a total failure, and it left us penniless, with ten children unprovided for. This loss so preyed on my husband that it produced paralysis and softening of the brain. For the last five years I have been toiling hard to support him and my young children. Those old enough are only gaining a bare existence by teaching, nor have we any relatives left in a position to help us. My home is broken up through misfortune and delicate health. I have been obliged to put my husband in an asylum, and I have five children to provide for. I shall feel deeply grateful if you will kindly assist me; it would be a real

charity, as I am in great distress. I enclose copies of letters I received when applying for a situation, and I refer you to. . . . Pray forgive my intruding my affairs upon you, indeed, I would not do so only for my destitute position. I cannot help appealing to the benevolent."

Doubtless, the promoters of this railway, like all enthusiasts, meant well, but enthusiasm is liable to make the greatest of men commit errors which the repentance of a lifetime cannot remedy. If the consequences rested on those who by their position should have known better, the evil wrought would be viewed in a different light to what it now is. The law cannot interfere to prevent the floating of gigantic schemes, a strong reason why all who are responsible for their success should carefully calculate the result of every possible contingency. One of the engineers of the Honduras line informed us that it would have required a track 150 miles long to complete the work, and that some of their wooden bridges had been wormed in a few months. No wood, save greenheart, can long resist the attacks of these enemies of the engineer, unless it be carefully sheathed with copper. A section of a pile will occasionally show matrix several inches in length and a thickness equal to that of a man's little finger, although the outer surface is perfectly smooth.

It seems barely possible in our cooler moments at the present time to believe that a half-civilised state, whose population, Indians included, only numbers some 300,000 souls, should be able in the open market to raise a loan of ten millions sterling at a rate of interest which would entail a tax of about £34 per annum on every man, woman, and child in it. At the time the loan was floated we hinted our doubts of the ability of Honduras to meet the demand. Two native hidalgos were present, and expressed their indignation at such an unworthy aspersion of their country's resources, which they believed were inexhaustible—besides, their honour was at stake.

Doubtless the science of engineers is able to tunnel under the Straits of Dover, to flood the Sahara, or to make South America an island; but the question naturally arises who is to pay for these great works? "Who will bell the cat?" There are good reasons for believing that English interests are not compromised by

the nonfulfilment of any one of these projects. The cost of transit of goods across the Channel only very slightly increases the cost of production, the results to trade by adding another arm to the Atlantic are doubtful, and a canal through the Isthmus of Panama cannot prove remunerative to the men of this generation. On this simple fact the attempt by private enterprise must solely depend, and it will indeed be a difficult task for the most sanguine to demonstrate that it will return a reasonable percentage on the necessarily gigantic outlay. In the United States the project was at no remote period looked on by many as a political job, brought forward to please a certain party. The depth of the feelings of that great people cannot be gauged until a subsidy is demanded in Congress, or the prospectus launched on the Stock Exchanges of New York and Boston. Small as the losses of the Americans have been in comparison to our own during the last five disastrous years, it is not too much to say that these cities would not subscribe a dollar without the certainty of a near return for their money. Of all nations they, from their geographical and political connection with the people of the Pacific Coast, are most deeply interested, and further, no other without the risk of constant squabbles could effectually undertake the police duties on the route. Neither an English nor a French force would be tolerated by the natives as the Americans are, who certainly, when the necessity arises, act with a promptitude and decision which is fully appreciated by the mongrel population on the Isthmus. It will, therefore, be advisable for England to stand aloof from the dazzling prospect which will shortly be displayed, until those more deeply interested than we can possibly be have convinced the world by practical demonstration of their readiness to bear a proper proportion of the outlay.

Great as the difficulties must have been in completing the Suez Canal, they cannot be compared with those which must inevitably attend the construction of a passage through the Panama isthmus. In the former the command of labour was unlimited, and the cost of removing a cubic yard of sand could consequently be fairly estimated, but it is doubtful if the greatest engineer could approximately state the cost of blasting a passage from the terminus of the Panama Railway to deep water on the

other side. In Egypt a despotic government simply required to know the number of labourers necessary, and the supply was forthcoming at a very low wage. On the Isthmus the lowest rate is six shillings per diem, but this will not tempt the natives to work steadily throughout the week or even a day. Indeed, to guard against this they divide the working day into three periods, viz., from 6 a.m. to 9 a.m., from 10 a.m. to 1 p.m., and from 2 p.m. to 6 p.m., thus necessitating the checking of labour lists three times daily. From long experience we do not believe it possible to alter the above regulations; the chances are that an increase in the demand for workmen would be a signal for a general strike from Santa Marta to San Juan de Nicaragua. It is of little importance to employers to learn how this institution took root in the country. We know it exists, and capitalists and engineers must be prepared to meet its baneful influence.

W. W. KIDDLE, *Assoc. I. C. E.*

ABSTRACTS OF SEA CASUALTIES, 1877-8.

AN exhaustive notice of the Wreck Abstract for 1876-7, which was the first published in the revised form, appeared in our numbers for August and September last. The return for 1877-8 enables us to draw some reliable comparisons between the wrecks in two years, and as we purpose following as closely as practicable in our present remarks the lines laid down in last year's notice, our readers would do well to have the numbers referred to at hand for reference.*

* We noticed last year that many of our contemporaries published a notice of the wreck abstract, which, from internal evidence, must have been prepared and sent to them from one hand, and the notice, in every case, bore evidence that it had been to a very great extent compiled from our own pages. We are glad to find our pages so useful, but we would remind the compiler of the notice to which we refer that it would be more in accordance with that feeling of justice and fair play which usually pervades British journalism, if, when our pages are made use of and our statements and ideas adopted and presented to the general public, some mention, however slight, were made of the fact.

In the first place it is a matter for congratulation that the return is this year published months before the usual date, and if, as is stated by Mr. Giffen in his Report accompanying the Annual Statement of Trade and Navigation, "the conditions of early publication are favourable to accuracy" we can heartily agree with him, and are moreover of opinion that early publication conduces greatly to the general interest taken in such returns.

In order to enable the reader to form an idea of the degree in which the British Mercantile Marine is affected by shipwreck, it may be well to show as shortly as possible its present magnitude.

The number and tonnage—which may be taken to represent about two-thirds of the actual carrying capacity—of vessels remaining on the register at the end of the year 1878 were as follow:—

	Sailing Vessels.		Steam Vessels.		Total.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
United Kingdom...	20,442	4,178,789	4,812	2,313,332	25,254	6,492,121
British Possessions	12,067	1,658,305	1,295	178,995	13,362	1,837,300
Total... ...	32,509	5,837,094	6,107	2,492,327	38,616	8,329,421

These figures show an increase of 368 in the number of vessels, and 195,584 in the tonnage during the year 1878, or taken with the figures for the year 1877 an increase during the two years of 936 vessels and 364,843 tons. The increase during 1878 is more than accounted for by the addition of 176,971 to the tonnage of steamers registered in the United Kingdom and the addition of 22,933 to the tonnage of steamers registered in the Colonies. How rapidly steamers are supplanting sailing vessels is shown by the fact that in the face of the enormous aggregate increase, there was a decrease in the tonnage of sailing vessels registered in the United Kingdom of 21,210 tons. Taking into consideration the superior carrying power of steam vessels arising from their greater speed, it is astounding to reflect on the rapid growth of the Mercantile Marine.

The effect of the greater speed of steam vessels is shown by the great increase in the entries and clearances at ports in the United Kingdom during 1878, compared with the figures for the previous year. The number and tonnage of British vessels entered and

cleared at ports in the United Kingdom during 1878, were as follow :—

	Sailing.		Steam.		Total.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Entered...	194,185	17,711,978	122,702	36,506,791	316,887	54,218,769
Cleared ...	166,231	16,400,949	114,745	33,691,936	280,976	50,092,885

These figures still further show how rapidly and surely steam vessels are taking the place of sailing vessels, for whilst there was an increase during 1878 in the entries of steam vessels of 1,703,231 tons and in the clearances of steam vessels of 1,935,370 tons, there was a decrease of 621,837 tons in the entries and of 504,159 tons in the clearances of sailing vessels. The net increase during the year was 1,081,393 tons in the entries and 1,431,211 tons in the clearances. Considering the vast increase in British shipping it may be disappointing to the croakers who look upon the slightest depression in any of the branches of trade as a sure indication of the approaching decline of British commerce, wealth and influence, to find that the decrease in the entries and clearances of foreign vessels at ports in the United Kingdom, to which we called attention last year, is steadily progressing. During the year 1878, there was a reduction of 4 per cent. in the entries, and of 3 per cent. in the clearances of foreign vessels, and this decrease specially presents itself in the oversea trade. The falling off in the number and tonnage of foreign vessels entering and clearing at ports in the United Kingdom is happily more than covered by the increased trade in British vessels.

Again we have to notice the continued decrease in the number of men and boys employed in British ships trading from ports in the United Kingdom. Notwithstanding the great increase in British shipping the number of hands employed is steadily decreasing, the decrease in 1878 being about 1000. This decrease is partly owing to the reduction in the tonnage of small sailing vessels in which more hands are required in proportion to the tonnage than in steamers, and to the fact that steamers are now manned by less hands in proportion to their tonnage than were formerly required.

We regret to find however that the decrease is entirely confined

to British seamen, the number of foreign hands being 23,343 out of a total of 195,585 against 22,636 out of a total of 196,562 in the previous year.

The difference between the registered tonnage of the United Kingdom and the portion actually employed during the year 1878, was 255,997 tons, of which about three-fifths belonged to steamers. The unemployed tonnage was a little under 4 per cent. of the tonnage in existence. These figures show an increase on the previous year of about 35,000 tons unemployed.

Wrecks of British Vessels at Home and Abroad.

It should be clearly understood that all the British vessels recorded in the Wrecks Abstract do not belong to the Mercantile Marine, or in other words that casualties to many small unregistered trading vessels and fishing vessels which are not registered under the Merchant Shipping Acts are recorded. The tonnage of these vessels is unimportant, but when they are treated as wrecks their numbers unduly swell the percentage of British vessels wrecked; it would, however, be still more inconvenient to add the 30,000 or more fishing vessels to the whole number of registered vessels merely for the sake of comparison, we must therefore be contented with the present data, but we trust our readers will remember this caution.

The number of British vessels, registered and unregistered, which were wrecked at Home during the year 1877-8 and were reported during the same period as having been wrecked abroad was 965, and their tonnage 269,034.

These totals were composed as follows :—

	Sailing.		Steam.		Total.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Belonging to the United Kingdom	532	148,682	89	53,145	621	201,827
Belonging to British Possessions Abroad ...	331	63,159	13	4,048	344	67,207
Totals, 1877-8 ...	863	211,841	102	57,193	965	269,034
Against—						
Totals, 1876-7 ...	1,056	234,395	99	57,095	1,155	291,490

These numbers bear the following percentages to the actual

number of vessels *registered* in the United Kingdom and Colonies respectively :—

	Belonging to the United Kingdom.				Belonging to the Colonies.			
	Sailing.		Steam.		Sailing.		Steam.	
Year	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
1877-8	2·6	3·5	1·8	2·3	2·7	3·8	1·	2·2
1876-7	3·1	3·9	1·9	2·5	3·5	4·3	1·2	1·7

Altogether 2·4989 of the British vessels in existence, and 3·2287 of their tonnage were lost during the year 1877-8, against 3·019 of the vessels and 3·583 of their tonnage lost during the previous year.

As regards the size of the vessels lost, the following results may be interesting :—

Percentages of vessels in existence between certain tonnages, lost by shipwreck in the years 1877-8 *and* 1876-7.

Year	Under 50	50 to 100	100 to 200	200 to 300	300 to 400	400 to 500	500 to 1,000	1,000 to 1,500	1,500 to 2,000	2,000 to 3,000
1877-8 ...	1·5	2·2	3·5	5·1	4·2	3·8	3·7	3·1	2·	1·7
1876-7 ...	2·	2·7	4·25	6·	5·	3·98	3·18	3·75	3·5	·89

All the foregoing tables show what a comparatively favourable year 1877-8 was as regards decrease in shipwrecks. The decrease in shipwreck was general among all classes of vessels, but as usual the vessels between 200 and 400 tons suffered most.

The average tonnage of British registered vessels in existence is for sailing vessels 179 and for steamers 408, and the average tonnage of vessels wrecked during 1877-8 is for sailing vessels 245 and for steamers 560, against 221 for sailing vessels and 576 for steamers in the previous year. We must however remind our readers that the percentage of vessels wrecked of a low class of tonnage is higher than it ought to be owing to wrecks of unregistered vessels being included. As regards classification, the return only distinguishes between the vessels which were, and the vessels which were not classed in Lloyd's, in Liverpool Iron Registry Book, and in Bureau Veritas ; but even from this standpoint and excluding the American, German, Norwegian, Austrian, and other kindred societies of good repute, it is not easy to perceive by the light of this trustworthy return that any safety is derived from classification.

Of the vessels registered in the United Kingdom which were totally lost, 236 with a tonnage of 123,478 were known to have been classed in Lloyd's, or the Liverpool Iron Book, or in Bureau Veritas; whilst 385 vessels with a tonnage of 78,349 were not classed in either of those registries. The unclassed division is of course swelled by all the small vessels before referred to, of which Lloyd's do not take cognizance.

Of the vessels belonging to the United Kingdom which foundered, 30, representing a tonnage of 15,347, were classed, and 89, representing a tonnage of 17,696, were not classed; but the unclassed vessels include 53 which were under 50 tons register. Sixty vessels belonging to the United Kingdom were reported as missing, of which 34 with a tonnage of 14,714 were classed, and 26, including 5 fishing vessels, with a tonnage of 4,315, were not classed. The average tonnage of the missing vessels belonging to the United Kingdom which were classed was 432, and of those which were not classed 166.

Of the 10 missing steamers included in the Return, all of which belonged to the United Kingdom, 6 were classed in Lloyd's, Liverpool Book, or Bureau Veritas:—

	Tons.	Crew.
King Shan, of Hull, Liv. 18 years, and Ver. 3/3; 4 years	983	24
Alice, of London, Ll. 90 A1; 4 years	303	19
Rose, of Hull, Liv. 15 years Red.; 6 years ...	522	17
Stamfordham, of N. Shields, Ll. 100 A1; new ...	955	27
Cromwell, of London, Ll. 90 A1; 13 years ...	565	19
Corinna, of London, Ll. 100 A1; 8 years ...	697	22
	4,025	128

The following 4 missing steamers were not classed in Lloyd's, Liverpool Book, or Bureau Veritas:—

	Tons.	Crew.
Mexican, of Liverpool; 14 years	839	38
Terrier, of Glasgow; 1 year	35	5
Albert and Edward, of London; new	790	19
Pioneer, of Swansea	126	11
	1,790	73

All the missing steamers which were classed were in the foreign trade; two of them were laden with coal at Cardiff; one with iron ore at Middlesbro', and one with iron rails, &c., at Antwerp; one was laden with grain at Baltimore, and another with palm oil, &c., at Brass River.

Of the four missing steamers which were not classed, three were coasting colliers, and the fourth, the *Mexican*, belonging to the West India and Pacific Steam Navigation Company, was bound from Port Royal, S. C., to Liverpool with a general cargo.

Whether classification would have worked the salvation of the vessels in the latter list, or whether the vessels in the former list would have stood a better chance of safety if their owners had simply been held responsible for their seaworthiness instead of being able to shift the responsibility to the shoulders of societies which are practically irresponsible, we do not pretend to say. But we do think that the foregoing lists are most significant, and we hope suggestive to the confiding sailor who is generally as ready to place superstitious reliance upon the cabalistic signs so freely allotted to classed ships, as ever he is to part with his money to the quack who awes him with a series of initial letters from purchased diplomas.

The tables showing the number of vessels which met with more than one casualty are very curious and instructive as showing how the total number of casualties are made up, and the increased dangers vessels are liable to in making rapid and frequent voyages through our crowded waters. One unfortunate vessel stands conspicuous as having met with five casualties during the year 1877-8, previously to the one which culminated in her total loss. Another of the vessels totally lost met with four casualties during the year, 10 met with three, and no less than 71 met with two casualties. The number of casualties exceeded the number of vessels involved by 248.

In addition to the 965 vessels totally lost, the return deals with 1,705 serious casualties which occurred to 1,621 vessels, and 3,361 unimportant casualties which occurred to 3,193 vessels. Altogether we find that the year 1877-8 was favourable to shipping as compared with recent years, and that this result was chiefly owing to the absence of great storms.

WRECKS AT HOME.

It is a practice with certain humanitarians and other specialists to exaggerate the amount of shipwreck on our coasts, possibly with the object of exciting interest in or sympathy with their special hobbies. Accordingly we find a member of Parliament, who has full access to all the Blue Books on the subject, and who cannot now be as liable to misconception as he was on first taking up the subject, exciting the sympathy of an inland audience by the statement that the number of shipwrecks on the coasts of the United Kingdom in a recent year had increased to 3,757 from an annual average of 2,226! It would not be difficult for us to cite sundry other remarkable instances in which the extent of shipwrecks is generally exaggerated to the public, and popular sympathy aroused by sensational announcements of figures and statements thoroughly misleading, and, in our opinion, mischievous in character. The motives which lead to these misrepresentations are doubtless of the purest and most unselfish description, but we doubt the morality of the means employed. In the end, however, some good may result from such sensational speaking and writing, for when the attention of the public is once fixed upon the subject truth will prevail, and there will then be found sufficient disaster to avert and misfortune to allay without recourse to exaggerated statements.

Instead of the shipwrecks on the coasts of the United Kingdom numbering 3,757, as stated by Mr. Plimsoll, we find from the Wreck Abstract that only 422 vessels were totally lost on the coasts of the United Kingdom, and in all the seas within an imaginary line drawn round the British Isles at a distance of about ten miles from the most prominent headlands, and that of these 422 vessels 80 belonged to foreign countries.

With a few notable exceptions the vessels lost belonged to the small class of coasters, and their tonnage compared with the whole tonnage of vessels lost was insignificant.

We have made an approximation of the tonnage of British vessels wrecked on the coasts of the United Kingdom, which appears to be as follows :—

	Founderings.	Strandings.	Collisions.	Other Causes.	Missing Vessels.	Total.
No. of Vessels ...	62	200	51	4	28	345
Tonnage... ...	4,310	35,923	10,777	100	3,233	54,343
Average Tonnage per Ship	70	180	211	25	115	157

The average tonnage of the ships which foundered is raised by the loss of H.M.S. *Eurydice*, 928 tons, and of the strandings by the wreck of the s.s. *Idaho*, 2,025 tons, on Coningbeg Rock, Wexford.

Of the 62 British vessels that foundered 49 were in the coasting trade, 3 were bound oversea, and 10 were fishing vessels. Of the 200 British vessels that stranded 121, including 14 steamers, were in the coasting trade; 59, including 9 steamers, were bound oversea, and 20 were fishing vessels.

The 28 missing vessels included 3 fishing vessels and 1 vessel in the foreign trade, which called at Falmouth for orders, and disappeared between that port and another port in the United Kingdom; the rest were coasters.

Of the 80 foreign vessels which were lost on our coasts 62 stranded, 6 foundered, 1 was abandoned after striking sunken wreck, and 11 were sunk by collision.

Of the 62 vessels that foundered 38 were over 20 years of age, the 2 oldest being between 70 and 80. Of the 28 missing vessels 10 were over 20 years, of which 3 were between 30 and 40, 2 between 40 and 50, and 1 between 70 and 80. It must, however, be remembered that nearly all these vessels were in the coasting trade, and that they are only a very small percentage of the vessels of their class, and that there is strong presumption that some of them were run down in the crowded waters round the coasts.

The year was remarkable for the absence of very destructive gales, although a few occurred of extraordinary violence.

On the 14th October, 1877, the *R. H. Jones* was wrecked on Plymouth Breakwater Bar, with a loss of 19 lives, during a storm from the S. and W. This gale extended over several days and caused several wrecks. On the 11th November, the *Sorata* foundered off Ramsgate, with 15 crew and 8 passengers, during a gale from S.W., and on the 12th November the *Lizzie*

Hobley was wrecked near Dymchurch, with a loss of 8 lives. A great gale was felt on the North coast of Scotland on the 16th November, in which the German brig *Elmine* was lost, with a crew of 8 hands.

These disasters, however, were dwarfed into insignificance by the loss of H.M.S. *Eurydice*. On a fine Sunday in March (25th) people in London were startled by a squall, which swept the dust in clouds over the houses and passed away doing less damage generally than might have been expected from its force and suddenness. But next morning the country was in mourning for the loss of 318 fine fellows in H.M.S. *Eurydice*, which, sad to say, was surprised by the same squall, off the Isle of Wight, and sank, under full sail with ports open.

The west wind has regained its distinction for destructiveness temporarily lost in 1876-7, when a large number of foreign vessels were driven ashore by east winds on our N.E. coasts. Of the 138 British and foreign vessels lost on our coast through stress of weather, 37 were caused by gales varying from N.E. to S.E., and 53 were caused by gales varying from S.W. to N.W.

The distribution of the symbols on the wreck charts varies greatly from the previous year, but this arises from the abnormal number of foreign vessels which were wrecked on the east coast of Scotland during December, 1876, and January, 1877. The only part of the coast on which wrecks were thicker during 1877-8 than in 1876-7, was the coast between North Foreland and the Isle of Wight, on which the symbols are 40 in the former year against 10 in the latter.

Of the 62 British vessels that foundered, 30 were lost from stress of weather, 27 from defects in vessel or equipments or from overloading or improper stowage of cargo.

Of the two hundred British vessels which were lost by stranding, 108 stranded through causes connected with the weather, 66 through error, neglect, or incompetency of persons in charge, and 5 on account of defective hull, &c.

There were 795 collisions on our coasts during 1877-8, of which 59 were attended with total loss, 233 with serious damage, and 498 with minor damage. In three cases both vessels in collision sank. Collisions between British vessels numbered 550, between

British vessels and foreign vessels 309, and between foreign vessels 86, of which 2 were attended with total loss.

Forty-three of the 59 collisions attended with total loss occurred at night. Thirty-eight collisions occurred between steamships under weigh, of which 4 were attended with total loss, and 152, of which 27 were attended with total loss, occurred between a steam vessel and a sailing vessel, both under weigh. Collisions between sailing vessels under way numbered 249, but only 17 were attended with total loss. Of the 59 collisions attended with total loss, 9 were due to bad look-out, 11 to neglect or misapprehension of sailing and steering rules, 21 to errors of judgment or want of caution, 5 to want of lights, 2 to foggy weather, 3 to parting cables, and 6 to causes undetermined.

The value of property lost by shipwreck on the coasts of the United Kingdom should not be estimated without reference to the trades in which the vessels were engaged. Of the 294 British vessels (excluding collisions) wrecked at home during 1877-8, 38 were in the fishing trade, 50 were laden with stone, slate, lime, bricks, clay, stone or cement, 5 with salt, &c., 89 with coal, 12 with grain, 13 with timber, and 51 were in ballast, of which probably the majority were colliers. It is therefore clear that a large amount of the tonnage lost on the Home coasts is not of the most valuable description. It appears almost marvellous that only 33 of the immense number of steamers trading on our coasts were lost by causes other than collision during the year, and that only 10 of these were lost by causes other than stranding.

Wrecks Abroad.

The British vessels wrecked abroad are generally of a much more important class than those wrecked at Home. We are glad to find however that there was a very sensible decrease in such wrecks during the year 1877-8 as compared with the preceding year. Only 583 British vessels, excluding collision casualties, were reported as having been lost abroad, *i.e.*, everywhere in the world outside the line comprising the limits of the Home Wreck Register, against 764 vessels lost in the previous year. Of these 583 vessels, 273 belonged to the United Kingdom and 315 to the Colonies, against

356 and 408 respectively in the previous year. "Foundering" accounts for the loss of 103 vessels, stranding for 370, miscellaneous causes, including spontaneous combustion, &c., for 53, and "missing" vessels number 60.

There is a great decrease in the number of founderings and missing vessels, the total of such losses being 281 for the year 1876-7 against 163 for the year 1877-8. This decrease is only a part of the general decrease in sea casualties during the year, but perhaps the number of such losses in 1876-7 was abnormal owing to the large number of fishing vessels which were lost in the North Sea on the 22nd January, 1877.

Of the 588 British vessels wrecked abroad, 264 were wrecked on the coasts of British Possessions Abroad, 157 on the coasts of foreign countries, and 167 were lost at sea. There were also 38 foreign vessels lost on the coasts of British Possessions Abroad, but here it may be observed that any comparison drawn from the figures in the Wreck Abstract as to the relative loss of British and foreign vessels would be entirely erroneous, for the abstracts only include the losses of foreign vessels on the coasts of the United Kingdom and on the coasts of British Possessions Abroad, whereas they include the losses of British vessels everywhere. We are induced to make this remark by the fact that a usually well-informed contemporary lately endeavoured to make such a comparison to the obvious disadvantage of British vessels.

Of the 163 vessels that foundered or were missing, 31 were laden with coal (but to these should be added 6 vessels which were burnt by spontaneous combustion of coal), 27 with grain, 20 with timber, 11 with general cargoes, 9 with metallic ores, 16 were fishing, or fish-carrying vessels, and 16 were in ballast.

Of the 60 missing vessels 15 were laden with coal, 13 with grain, 6 with general cargoes, and 6 were in ballast. Fourteen of the missing vessels were under 3 years, 26 under 7 years, and only 6 over 20 years of age.

Of the 588 British vessels which were lost abroad 262 were lost owing to the action of the elements, and 153, including 49 vessels which were unseaworthy, overladen, insufficiently equipped, &c., &c., were lost owing to the act or default of man.

It may be observed, however, that 26 of the 49 presumably unseaworthy vessels were lost by stranding, and it is therefore probable that the defects were not in the vessels, but in the charts or compasses by which they were navigated. It is quite time that shipowners, or at any rate underwriters, should begin to deal very seriously with the chart question. Masters are now far too often expected to provide out of their own pockets adequate charts and chronometers for the voyage on which the vessel is about to enter. This entails when liberally done an expense which is a severe tax on the generally slender incomes of masters, and it is no wonder, therefore, to find that some masters venture to sea with old or inadequate charts. Indeed some ships are sent on over-sea voyages without chronometers at all. The time will surely come when no vessel will be allowed to leave port without the latest charts for the voyage for which she is intended, and at least one chronometer if going out of sight of land. Such care is essential to the safety of the ship and the lives of those on board, and if owners cannot settle the question satisfactorily, they may expect that the Legislature will sooner or later settle it for them.

Inquiries into Wrecks at Home and Abroad.

Formal inquiries were reported during the year 1877-8 as having been held in 344 cases of wreck and casualty. Of these 344 inquiries 36 were held before the Wreck Commissioner, 134 before magistrates in the United Kingdom, 141 before Courts in British Possessions Abroad, and 33 by Naval Courts in foreign countries. Of the increased cost of these inquiries we shall have something to say when the time arrives.

Of the 170 inquiries held in the United Kingdom 17 related to founderings and abandonments, 131 to strandings, 17 to collisions, and 5 to fires and explosions. The provision made in Clause 2 of the 32nd Section of the Merchant Shipping Act, 1876, for formal inquiry in regard to missing vessels, seems to be practically inoperative. Only three formal enquiries have been held respecting missing vessels since the passing of the Act, and in those cases the results were so indefinite and unsatisfactory that it is not surprising to find that not one of the 88 missing vessels in 1877-8

became the subject of formal investigation. Informal inquiry is, we believe, made in such cases by the proper authorities, but except for statistical and official purposes such inquiries are worthless, as the results are not published. Missing vessels form the most deplorable and difficult subject connected with the Mercantile Marine.

Loss of Life.

The loss of life in British ships during the year 1877-8, although deplorable, was considerably below the average. Including persons of all ages and of both sexes lost by casualties to British ships all over the world during the year in question, we find that 2,452 lives were lost, of whom 1,869 were lost in vessels belonging to the United Kingdom, and 583 were lost in Colonial vessels. There were, however, 97 lost in foreign vessels, of whom 76 were lost on the coasts of the United Kingdom, and 21 on the coasts of British Possessions Abroad, raising the total of lives lost, which are dealt with in the Abstracts, to 2,549, as against a total of 3,475 in the previous year. These figures show a reduction when compared with the figures for 1876-7 of 599 in the number of lives lost in British ships, and of 327 in the number of lives lost in foreign vessels in British waters. The number of lives lost in vessels registered in the United Kingdom was 329 less than the number for the preceding year, and the number of lives lost in Colonial vessels 270 less than the number for the preceding year. But when the numbers are analysed the result as regards British merchant seamen is very remarkable. Deducting the number of passengers lost, and the number of lives lost in H.M.S. *Eurydice*, we find that the number of seamen lost by casualties to vessels of all kinds belonging to the United Kingdom was 1,317, and the number of seamen lost in vessels registered in the Colonies was 382, making a total of British seamen, fishermen, pilots, &c., lost during the year of 1,699, against 2,740 lost in the previous year.

Deducting the Government passengers lost in H.M.S. *Eurydice*, we find that the number of passengers lost in British ships was 435, of whom 234 were lost in vessels belonging to the United Kingdom, and 201 in Colonial vessels. The number of passengers

lost in sailing vessels was 222, of whom 117 were lost in Colonial vessels, and the number of passengers lost in steam vessels was 213, of whom 82 were lost in Colonial vessels. The most noteworthy cases in which passengers were lost were as follow :—

Native Indian Dingy	Stranded	58 passengers	and 5	crew lost.
Eten, s.s.	Stranded in Chili ...	35 ,,	49	,,
Atacama, s.s. ...	,, ,, ...	49 ,,	53	,,
Loch Ard	Stranded in Victoria	17 ,,	33	,,
Avalanche	Collided with *Forest* in English Channel	63 ,,	32	,,

The number of passengers lost in British ships on the coasts of the United Kingdom was 115, including the families of captains, and the number of passengers lost in British vessels abroad was 342.

The total number of lives lost on the coasts of the United Kingdom in 1877-8 was 892, or excluding lives lost in H.M.S. *Eurydice* 574, or still further excluding foreign vessels 477. This number shows an increase of 18 upon the number for the previous year, although there is a great reduction in the number of vessels from which life was lost. This is accounted for by the increase in the number of vessels missing in the coasting trade, in which all the crews were lost, and by the decrease in the number of fatal strandings by which only part of the crews were lost. The number of missing vessels in the home coasting trade in 1876-7 was 17, and the number of lives lost 93; but the number of missing vessels in 1877-8 was 28, and the number of lives lost 155. On the other hand, the number of fatal strandings, including foreign vessels, in 1876-7, was 86, and the number of lives lost 470; whereas, in 1877-8 the number of fatal strandings was only 42, and the number of lives lost 154. The number of fatal collisions near the coasts in 1877-8 was 29, with loss of 181 lives, against 30 fatal collisions and a loss of 57 lives. The increase is accounted for by the large loss of life resulting from the *Avalanche* and *Forest* collision.

Founderings contributed 377 to the number of lives lost, of whom 318 were lost in H.M.S. *Eurydice*, and 59 in twelve other vessels.

The following tables may be interesting:—

LOSS OF LIFE ON COASTS OF UNITED KINGDOM.

	Sailing. Vessels.	Sailing. Lives lost.	Steam. Vessels.	Steam. Lives lost.	Total. Vessels.	Total. Lives lost.
Vessels belonging to United Kingdom	86	708	14	88	100	796
Vessels belonging to Colonies ...	5	20	—	—	5	20
Foreign Vessels ...	20	74	1	2	21	76
Total	111	802	15	90	126	892
Totals for 1876-7 ...	117	680	15	96	192	776

LOSS OF LIFE ABROAD.

	Sailing. Vessels.	Sailing. Lives lost.	Steam. Vessels.	Steam. Lives lost.	Total. Vessels.	Total. Lives lost.
Vessels belonging to United Kingdom	89	574	39	499	128	1,073
Vessels belonging to Colonies	63	455	4	108	67	563
Foreign Vessels ...	4	18	1	3	5	21
Total	156	1,047	44	610	200	1,657
Total for 1876-7 ...	279	2,101	41	598	320	2,699

Of the 1,657 lives lost abroad, 492 were lost in British and foreign vessels on the coasts of British Possessions Abroad, 331 were lost in British vessels on the coasts of foreign countries, and 834 were lost in British vessels on the open sea.

The following table shows the loss of life in British vessels at Home and Abroad:—

CASUALTIES INVOLVING LOSS OF LIFE.

		Coasting.	Oversea.	Fishing.	Total.
Founderings ...	Vessels	11	16	5	32
	Lives Lost	47	410	19	476
Strandings	Vessels	32	37	2	71
	Lives Lost	167	454	6	627
Collisions	Vessels	13	12	6	31
	Lives Lost	41	144	9	194
Other Causes ...	Vessels	11	51	16	78
	Lives Lost	404	81	35	220
Missing Vessels ...	Vessels	37	46	5	88
	Lives Lost	269	642	24	935
Totals	Vessels	104	162	34	300
	Lives Lost	628	1,731	93	2,452

These figures may be shown again as follows:—

		Coasting.	Oversea.	Fishing.	Total.
Vessels belonging to the United Kingdom... ...	Vessels	63	132	33	228
	Lives Lost	240	1,547	82	1,869
Vessels belonging to the Colonies	Vessels	41	30	1	72
	Lives Lost	388	184	11	583
Totals	Vessels	104	162	34	300
	Lives Lost	628	1,731	93	2,452

The most striking and gratifying point in the Abstract is the decrease in the number of missing vessels bound oversea. The number is, however, still extremely awful, and we hope that the next Wreck Abstract will show a further decrease.

We regret, however, to find that there is no decrease in the number of lives lost in coal-laden vessels, of which no less than 30, with 312 men on board, were missing. These 30 missing vessels were composed as follows:—

In the Home coasting trade—

	Vessels.	Tonnage.	Lives Lost.
Steam	3	951	35
Sailing	13	1,378	67
	16	2,329	102

Bound oversea from Home ports—

	Vessels.	Tonnage.	Lives Lost.
Steam	3	1,785	48
Sailing	6	4,018	95
	9	5,803	143

Bound from one foreign port to another—

Sailing	5	2,071	67

SUMMARY.

	Vessels.	Tonnage.	Lives Lost.
Steam	6	2,736	83
Sailing	24	7,467	229
	30	10,203	312

Altogether the Abstract of Wrecks is less appalling than it has been for many years, and we hope that as the dangers of navigation are more clearly marked and seamen are better educated

and paid, and ships are better built and equipped, the most disagreeable features of this Annual Return will disappear. The prospect is rather "Utopian" we must confess, but much has already been accomplished in the direction indicated, and a great deal more will be accomplished before the world has grown much older. After all, the loss of life at sea compares favourably with the loss of life on railways and in mines, and it is startling to find that the loss of life by drowning in inland waters in England and Wales alone was 2,662, whereas the loss of life in British ships all over the world was only 2,452, and in British ships near the coasts of the United Kingdom, including 318 lives lost in H.M.S. *Eurydice*, only 795.

THE WAR IN SOUTH AMERICA.

SELDOM has a war broken out which, considering the limited range within which hostilities have been carried on, has produced more interruption and greater inconvenience to a considerable branch of maritime trade than that which is being waged between the Republics of Peru and Bolivia on the one side, and of Chili on the other. Of the origin of this war little of a definitive character is known beyond the fact that between the Republics in question there has long existed a chronic jealousy which was likely at any time to lead to an open rupture. The acquisition of territory at least does not appear to have had any place in the design of the combatants. It is certain, however, that Chili, owing to a course of procedure honourable to her rulers and her people, has been gradually acquiring an influence in the Pacific superior to that of the neighbouring Republics—an influence which in itself must be regarded as an extension of power and authority. However this may be, certain it is that on the 6th of February in the present year, a Treaty of Alliance was entered into between Peru and Bolivia, providing for their mutual defence, and as in the war which shortly afterwards broke out the Chilians took the initiative,

it may be that in the opinion of the Peruvians the time had come for putting themselves on the defensive, and with that object of securing the assistance of an adjacent State. So far, although considerable numbers of troops have been massed at different points along the line of hostilities, the operations have been conducted principally at sea. Two maritime engagements are already reported to have taken place in the neighbourhood of Iquique, with some important results. On the 12th of April the first meeting between the belligerents took place. The Chilian gunboat, *Magallanes*, having left Antifagasta for Iquique, fell in with two Peruvian war ships off the mouth of the Loa. These vessels, at first taken to be Chilians, turned out to be the *Union* and *Pilcomayo*, mounting twenty guns, while the *Magallanes* carried but two. Unequally, however, as the ships were matched, the Chilians appear to have had the best of the encounter. This affair was speedily followed by an action also off the port of Iquique between the Peruvian ironclads *Huascar* and *Independencia* on the one side, and the Chilian ships *Coradonga* and *Esmeralda* on the other. It will be remembered that the *Huascar* some time since achieved notoriety by a gallant encounter with Her Majesty's ships *Shah* and *Amethyst*. In the recent action also this ship appears to have played a conspicuous part. Having called upon the Chilian force to surrender, and being answered only by a broadside, the *Huascar* rammed the Chilian ship *Esmeralda*, sinking her and drowning ninety of her crew; but this success was counterbalanced by the loss of the *Independencia*, which ship, it appears, in pursuing the *Coradonga*, got ashore, and was subsequently fired to prevent her falling into the hands of the Chilians, and the *Coradonga* escaped. In this encounter, therefore, each side lost a ship, and it would seem the other two ships thought it prudent not to prolong the engagement.

These appear to be the principal events of the war so far as actual collision between the hostile forces is concerned. Of the movements of the land forces of the belligerents we have but scant information. Beyond the fact that the President of Peru has assumed the chief command of the allied Peruvian and Bolivian forces, little seems to have transpired; but whatever the course

which may be pursued by those in command of the belligerent troops, it will be to foreign States, and especially to this country, of very secondary importance compared with the operations at sea and along the coast which have already attracted much attention, and have formed the subject of protests on the part of the British, American, French, German, and Italian ministers at the Peruvian capital. There is abundant reason for this demonstration on the part of the representatives of these States. The war had hardly broken out between the West Coast Republics when a Chilian maritime force proceeded to the Peruvian guano deposits at Huanillos and Pabellon de Pica. These are undefended places, but the Chilian force nevertheless bombarded them, and as no other injury could be inflicted destroyed the staging shoots and other appliances for the shipment of guano. This was a ruthless and needless interference with neutral commerce, and has produced widespread inconvenience and loss to parties in no way concerned in the pending hostilities. This wanton destruction of commercial facilities and interference with an innocent branch of trade has been followed by attacks by the Chilian fleet on other undefended places, by the burning of Mejillones and the destruction of the submarine cable off Arica. It is not denied, of course, that belligerents have their rights as well as neutrals, but the tendency of the usages of modern maritime warfare has been in the direction of a respect for neutral rights and for the results of industry. Where merchandise has been sacrificed in modern warfare it has generally been to prevent it falling into the hands of the enemy—never for mere revenge or the greed of destruction. To destroy the means of shipment at the guano deposits, simply because they stood on Peruvian soil, and of a quantity of neutral property at Mollendo and elsewhere for the same reason, is a course of procedure unworthy of any State assuming to rank within the circuit of civilisation, and certainly unworthy of the reputation which, before the outbreak of this war, the Republic of Chili was fast acquiring for herself. It may be hoped that the Chilian Government will not be insensible to the very strong expression of opinion of the diplomatic body in Lima, backed as it has been by public opinion in America and in England. We learn from a trade circular, published in Callao last

month, that preparations are being made to open up guano deposits to the northward on the Peruvian coast, in the expectation that the war will be confined in the south. This may be, and we have only to hope that the enterprise may be successful. But whether successful or not, it will leave the responsibility which the Chilian Government have incurred towards neutral States by acts of gratuitous violence unexplained and unatoned for.

Apart however from the fact of the destruction of the guano trade appliances at the ports of Huanillos and Pabellon de Pica, there appears to be a disposition on the part of the Chilians to treat the interests of neutrals with consideration. This has been shown by the conduct of the Chilian commander at Iquique, who it would seem has afforded time and opportunity to both Peruvians and neutrals to clear out of that place. It is satisfactory however to know, and for this we have the assurance of the foreign minister, that the protection of British interests along the West Coast of South America has been confided to a British and German maritime force, a better assurance than is afforded by the apparent disposition of either belligerent.

A trade question of considerable importance has also arisen out of the circumstances of this war. Before there was any rumour of a war or the prospect of hostilities in the Pacific, a number of guano ships had been chartered in England and on the continent to load at the Peruvian deposits. These ships have found on arrival off the coast of Peru that they cannot load or even enter their ports of destination. What are the masters of these ships to do? The question is more easily put than answered. Go, it has been said, to the nearest safe port, telegraph to the owners and await instructions. But at the nearest safe port there may be no means of communication—and if the master, after doing all which his prudence and sagacity can suggest is compelled to return without a cargo, who is to bear the loss? Common sense and justice would say that where a state of things has arisen which none of the parties to the venture could have foreseen, and which consequently could not be provided against, the loss should be equally or rateably divided. But this is not the way perhaps that such a state of things would be treated by lawyers and underwriters. Yet the blockade of Peruvian ports and the

destruction of the means of shipment at the guano deposits have produced this state of affairs, and for which there seems to be no satisfactory solution except in a mutual understanding on the part of shipowners and merchants to share their losses. It is perhaps too much to expect that any belligerent should surrender anything in the nature of a belligerent's right—but it may be hoped that minor States, such as the Republics of Chili, Peru, and Bolivia will not be superior to remonstrance addressed to them by the leading maritime powers.

A NEW AND SIMPLE DEMONSTRATION OF THE RULES FOR COMPUTING THE AMPLITUDE AND THE TIME OF RISING AND SETTING OF A HEAVENLY BODY.

By THOMAS DOBSON, M.A., Head-Master of the Marine School, South Shields.

THE mode of demonstrating a theorem is not of much consequence to a skilled mathematician so long as the reasoning is logical and the resulting formula correct; but to the teacher, who has to explain, and to the student, who has to comprehend, it is of great importance that the demonstration should be as simple and as direct as possible. This is especially desirable in teaching Nautical Astronomy, the student having been rarely well prepared for such a study by a previous training in elementary mathematics. The proofs of some of the rules which guide the navigator in his computations may not be susceptible of much simplification, but that some may be improved in point of simplicity will, I think, appear from the following demonstration of the formulæ for finding the amplitude and time of rising and setting of a heavenly body.

In all the works that I have consulted, English, French, and American, these formulæ are either derived from others of a more general nature, by substituting special values peculiar to the case of rising or setting, or by the application of Napier's Rules of circular parts. The annexed demonstration depends only on

the easily-applied theorem, that the sines of the sides of a spherical triangle are proportional to the sines of the opposite angles.

Let P be the north pole, and Q D E R the equator; Z the zenith, and E S N the horizon of the observer. Then P N = Z R is the latitude, and N Q = Z P the co-latitude. If S in E N be the rising sun, and P S D a meridian, then P S is the polar distance, S D the declination, and E S the amplitude of the sun. The time of sun-rise, reckoned from midnight, is measured by the arc Q D; and, reckoned from noon, by the arc R D.

The angle at E is common to the two right-angled triangles E S D and E N Q, and, by equating two equal values of the ratio sin 90° : sin E, we have,

$$\sin E S : \sin S D :: \sin E N : \sin N Q :$$

But, sin E N = sin 90° = 1; and sin N Q = cos P N;

$$\therefore \sin E S = \frac{\sin S D}{\sin N Q} = \frac{\sin S D}{\cos P N} = \sin S D. \sec P N,$$

since sec P N. cos P N = 1; hence,

$$\sin \text{amplitude} = \sin \text{decl. sec. lat.}$$

Again, the angle at S is common to the two right-angled triangles E S D, and E N Q; and equating the values of sin 90° : sin E, we have,

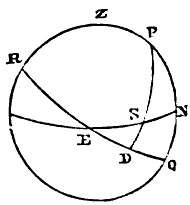
$$\sin E D : \sin E S :: \sin P N : \sin P S :$$

$$\therefore \sin E D = \frac{\sin P N}{\cos S D} . \sin E S = \frac{\sin P N}{\cos S D} . \frac{\sin S D}{\cos P N}$$

But, sin E D = cos D Q = − cos R D;

$$\therefore - \cos R D = \tan P N. \tan S D;$$

or, $$- \cos \text{hour angle} = \tan \text{lat.} \tan \text{decl.}$$



[Many of our readers will, no doubt, thank Mr. Dobson for the above interesting demonstration; it is undoubtedly new, nothing exactly similar in form having been published, but it eventually and gradually resolves itself into the old method; and we do question its simplicity as compared with the old demonstration, especially in the "equating the two equal values of the ratio sin 90°: sin E."—ED. *N. M.*]

SIGNALS OF DISTRESS AT SEA.

FOR many centuries the signals of distress to be shown and used by British ships consisted of the red ensign, union down, and the minute gun; and early during the present century, rockets, flames and "blue lights" had come into use for the same purpose. How these signals have been altered and systematised, how signals of distress have become uniform and international, and the persons by whom, and the means by which this work has been brought about are recorded in Parliamentary Paper, No. 150, of 1873. On that Paper the following observations are founded.

In the year 1860 the attention of shipowners had been drawn to the necessity for establishing order and regularity in the matter, for it had come about, in the first place, when assistance had gone out in answer to rockets, guns, flames and blue lights, that the persons in the tugs, lifeboats, and luggers found out that the masters making the signals had merely wanted a pilot, or were only signalling to their friends, or, what was infinitely worse, were merely indulging in a display of fireworks preparatory to arriving in port; and in the second place, and, as a direct consequence, that these signals, when used and burnt as signals of distress, were in most cases disregarded.

In that unfortunate state of things it was not a very uncommon occurrence for crews to perish because their signals of distress were regarded as useless and frivolous displays of fireworks, for boats and tugs would not go off in a hurry, and at great exposure and risk of life, to find they were not wanted.

In 1864 the Board of Trade took up the matter in earnest, in consequence of a letter from the Commodore of the Coast Guard giving the particulars of a case in which the lifeboat had put off in a hurry at night in answer to rockets fired by the *Medora*, of London, which vessel merely desired the services of a pilot for ordinary pilotage, and was in no distress. The lifeboat was out on this needless service on a squally, rainy night from 9 p.m. until

1.30 a.m., and it was this case of indulgence in rocket firing that first enabled the Board of Trade to take the matter seriously in hand.

The first difficulty the Board of Trade encountered was opposition from certain steamship lines, who were in the habit of using fireworks, and especially rockets, as private signals to announce the arrival of their ships off the coasts, and for salutes between their ships passing each other at night at sea. In order that the steamship lines might indulge in their firework system, it was suggested to the Board of Trade that a red rocket should be legalised as a signal of distress and should be used for no other purpose, and that all ships should carry them. It was not made clear at that time why a red rocket should be selected; but inasmuch as the red colour of a rocket is obtained from a nitrate that is very unstable, and very liable to spontaneous combustion, it would seem to have been an appropriate suggestion; for nitrate of strontia in a rocket might set a ship on fire and so render assistance from the shore or from another ship necessary. The Board of Trade do not appear to have seen their way to adopt the red rocket, the only specific suggested by certain shipowners, and the matter, to outward appearance, slept for a few years.

In 1865 the steamship *Stanley* was wrecked off the Tyne entrance, and sent up plenty of rockets which were totally disregarded. When the rockets fired by the *Stanley* were observed by the people on shore at Tynemouth they seem to have been much admired; and as every pilot who saw them (and a great number did) regarded them as some new combination or private signal expressly designed for the information of some one pilot, who was, they all supposed, expected to attend to that ship, and, as the signal did not happen to be a private signal, no one paid any attention to it at all. The *Stanley* and twenty-four lives were lost thereupon. The number of unrecorded cases in which rockets had been disregarded would exceed belief, and the sole reason for that disregard had been that they were considered to be private signals meant to be understood by somebody, who never, however, happened to be near to interpret them.

In 1869, the Royal National Lifeboat Institution, who were

always great sufferers by the use of indiscriminate signalling, inasmuch as their lifeboats were frequently going off on wild goose chases by day and night in answer to supposed demands for help, and whose funds were wasted thereby, once again called the attention of the Board of Trade to the subject, and suggested legislation in order that special signals might be made by ships wanting "a lifeboat, a steamtug, a pilot, an anchor and cable, or a medical man." In January, 1870, seeing that the shipowners and underwriters could or would do nothing of themselves, the Board of Trade made another outward start by again communicating with the principal lines of shipowners, the Local Marine Boards, Lloyd's, and other bodies. The next two years appear to have passed in the receiving and considering of suggestions, for no sooner was it bruited abroad that the Board of Trade were really in earnest this time, than the shipowners exercised themselves to show that the case of the *Stanley* would never happen again, and that shipowners ought to be allowed to use all sorts of rockets and fireworks for private signals, when and how and where they pleased. Inventors began to invent, each submitting his creation as the only and all-sufficient remedy.

By the year 1871 three things had become apparent: first, that as the shipowners would not give up their private fireworks they would have to be regulated; secondly, that a statutory significance must be given to certain signals as signals of distress only; and thirdly, that pilot signals also must be regulated. The licence of the shipowner had to be curbed, and the conservative tendencies of the authorities having to do with pilotage matters had to be combated. Out of this state of things sprang the notion that any system hereafter adopted must be international, and should, in fact, form part of the International Code of Signals.

On the 2nd October, 1872, the Board of Trade, who seemed determined to push the matter through, in face of opposition, sent out broadcast a notice as follows:—

"SIGNALS.—PILOTAGE AND DISTRESS.

"The Board of Trade have for a long time been in communication with shipowners, and with the Public Departments, with a

view to establishing certain signals to be used by ships in distress and by ships wanting pilots. The Board of Trade have, with great care, ascertained full particulars of the signals made at night by the ships of private companies (chiefly by a combination of rockets and blue lights), and have framed a set of rules to establish signals which, whilst they interfere with no existing signals, are in themselves simple and unmistakeable.

"The Admiralty and the Trinity House, and all public bodies and companies with whom the Board have corresponded, agree as to the necessity for authorised signals of distress, and the question has been so far narrowed that there only remained one or two points to settle by conference.

"This was done at a meeting at the Board of Trade, consisting of Captains Were and Weller, Elder Brethren of the Trinity House; Mr. J. Hart, of the Pilotage Department of the Trinity House; Captain Simpson, Superintendent of Pilotage at Liverpool, and Captain Wilson, of the Mersey Docks and Harbour Board; and Admiral Bedford and Mr. Gray, of the Board of Trade.

"At this meeting it was unanimously agreed that it would be well if rules were made as given below. It was proposed that these rules should be printed in draft, and circulated at an early convenient opportunity, with a view to careful consideration and subsequent embodiment in the Merchant Shipping Code Bill.

"The draft rules agreed to were—

"1.—*Signals to be made by Ships wanting a Pilot.*

"That the signals be—

"(*a*) *In the daytime.*—To be hoisted at the fore, the Jack or other national colour usually worn by merchant ships, having round it a white border, one-fifth of the breadth of the flag.

"(*b.*) *At night*—

"1. A blue-light every 15 minutes; or,

"2. A bright white light, flashed or shown at short or frequent intervals, just above the bulwarks, for about a minute at a time.

2.—*As regards Signals of Distress.*

"(*a.*) *In the daytime.*—The following signals, numbered 1, 2,

and 3, when used or displayed together or separately, shall be deemed to be signals of distress in the daytime :—

" 1. A gun fired at intervals of about a minute.

" 2. The Commercial Code signal of distress, indicated by N C.

" 3. The distant signal, consisting of a square flag, having either above or below it a ball, or anything resembling a ball.

" (The Ensign Union down has been advisedly omitted, because many foreign flags are the same whether right side or wrong side up; and because it is hoped that the signals now suggested may become international.)

" (*b.*) *At night.*—The following signals, numbered 1, 2, 3 and 4, when used or displayed together or separately, shall be deemed to be signals of distress at night :—

" 1. A gun fired at intervals of about a minute.

" 2. Flames on the ship (as from a burning tar barrel, oil barrel, &c.).

" 3. Rockets of any colour or description, fired one at a time, at intervals of about five (5) minutes.

" 4. Blue lights, burned one at a time, at intervals of about five (5) minutes.

" (Signed) THOMAS GRAY."

Besides sending out the above circular notice to all shipping associations in the United Kingdom, the Foreign Office sent it to the Governments of all foreign countries, with a view to securing its adoption as a part of the International Code of Signals, and before the year 1872 had expired, the Board of Trade had received the adhesion of several Foreign Governments to their proposals; whilst in the United Kingdom many shipowners and Local Boards and Societies had also agreed to them. Some shipowners, however, feared that if signals of distress were once legalized, they could no longer refuse to pay salvage when the masters called out people from the shore by those signals. So long as signals of distress were not legalized signals, it was always open for a shipmaster to use them when he wanted assistance very badly, or when he wished to send a letter ashore in the Downs, and the owners could contend afterwards that the signals made were not intended for signals of distress, and that the service rendered in answer to them was common

boatman's service, or pilotage service at the best, if indeed it were any service at all.

While the Board of Trade appear to have been pushing and insisting on the adoption of these signals, and were getting them into shape for the next session's Bill, a circumstance happened which called public attention to the matter. On the 22nd July, 1872, the *Northfleet* was run down, and 293 lives were lost. The old story came out on investigation, and it was shown that rockets had been sent up from the *Northfleet*, that they were seen from the shore and by other ships, many of which were near to her. Most people thought the rockets were a special or private signal to some individual pilot or boatman who would understand them; and as no one regarded them as distress signals, loss of life happened. This terrible disaster, by arousing the popular sympathy, enabled Mr. Chichester Fortescue to carry through Parliament the following clauses, which are in substance the proposals agreed to by the committee which met at the Board of Trade in November, 1872, and referred to above:—

"NOTICE TO MASTERS AND OWNERS.—SIGNALS.

"The following sections, together with the schedules referred to therein, of the Merchant Shipping Acts Amendment Act, 1873, relate to Signals of Distress, Signals for Pilots, and Private Signals:—

"18. *Signals of Distress.*—The signals specified in the first schedule to this Act shall be deemed to be signals of distress. Any master of a vessel who uses or displays, or causes or permits any person under his authority to use or display, any of the said signals, except in the case of a vessel being in distress, shall be liable to pay compensation for any labour undertaken, risk incurred, or loss sustained in consequence of such signal having been supposed to be a signal of distress, and such compensation may, without prejudice to any other remedy, be recovered in the same manner in which salvage is recoverable.

"19. *Signals for Pilots.*—If a vessel requires the services of a pilot, the signals to be used and displayed shall be those specified in the second schedule to this Act. Any master of a vessel who

uses or displays, or causes or permits any person under his authority to use or display, any of the said signals for any other purpose than that of summoning a pilot, or uses or causes or permits any person under his authority to use any other signal for a pilot, shall incur a penalty not exceeding twenty pounds.

"20. *Power to alter Rules as to Signals.*—Her Majesty may from time to time, by Order in Council, repeal or alter the rules as to signals contained in the schedules to this Act, or make new rules in addition thereto, or in substitution therefor, and any alterations in or additions to such rules made in manner aforesaid, shall be of the same force as the rules in the said schedules.

"21. *Private Signals.*—Any shipowner who is desirous of using, for the purposes of a private code, any rockets, lights, or other similar signals, may register such signals with the Board of Trade, and the Board shall give public notice of the signals so registered in such manner as they may think requisite for preventing such signals from being mistaken for signals of distress or signals for pilots. The Board may refuse to register any signals which, in their opinion, cannot easily be distinguished from signals of distress or signals for pilots. When any signal has been so registered the use or display thereof by any person acting under the authority of the shipowner in whose name it is registered shall not subject any person to any of the penalties or liabilities by this Act imposed upon persons using or displaying signals improperly.

"SCHEDULE I.—SIGNALS OF DISTRESS.

"*In the Daytime.*—The following signals, numbered 1, 2, and 3, when used or displayed together or separately, shall be deemed to be signals of distress in the daytime :—

"1. A gun fired at intervals of about a minute;

"2. The International Code signal of distress indicated by N C;

"3. The distant signal, consisting of a square flag having either above or below it a ball, or anything resembling a ball.

"*At night.*—The following signals, numbered 1, 2, and 3, when used or displayed together or separately, shall be deemed to be signals of distress at night :—

"1. A gun fired at intervals of about a minute;

"2. Flames on the ship (as from a burning tar barrel, oil barrel, &c.);

"3. Rockets or shells, of any colour or description, fired one at a time, at short intervals.

"SCHEDULE II.—SIGNALS TO BE MADE BY SHIPS WANTING A PILOT.

"*In the daytime.*—The following signals, numbered 1 and 2, when used or displayed together or separately, shall be deemed to be signals for a pilot in the daytime, viz:—

"1. To be hoisted at the fore, the Jack or other national colour usually worn by merchant ships, having round it a white border, one-fifth of the breadth of the flag; or,

"2. The International Code pilotage signal indicated by P T.

"*At night.*—The following signals, numbered 1 and 2, when used or displayed together or separately, shall be deemed to be signals for a pilot at night, viz.:—

"1. The pyrotechnic light commonly known as a blue light every fifteen minutes; or,

"2. A bright white light, flashed or shown at short or frequent intervals just above the bulwarks, for about a minute at a time."

In practice it has been found that large merchant ships have no difficulty as a rule in making signals of distress; the flames are made by means of Holmes's Signal Flare, a composition which burns in water, and will not burn without water, and guns and rockets can generally be fired. But for vessels, say those of 200 tons and under, down to the sloop and decked fishing smack, there have been practically no means yet devised for making the statutory signals. It is not long ago that serious danger and difficulty arose in the Bristol Channel through small vessels wanting assistance and not carrying means of making the proper signal. It will be observed that the clauses of the Merchant Shipping Act, 1873, printed above, though they prescribe the signals for pilots and of distress, in no way make it incumbent on the shipowner to put on board his ship any means for making any of those signals. It is true that passenger steamers and emigrant ships are required

under other Acts of Parliament to place on board, before they leave the United Kingdom, full means of making signals of distress; but by far the great majority of ships, British and foreign, are altogether unprovided with any means whatever. The cause of this state of things is not far to seek. It is of no use for a ship to carry roman candles, red lights, coloured fires, and so forth, so long as private firework signals are in existence; and further, because such things, while they might be of use on a dark clear night, are absolutely useless in foggy weather, and a gun is of very little use on a stormy night unless it is capable of firing a 16 oz. charge of powder. The main difficulties, however, which shut out the gun and the rocket from small coasters, are, first that it is difficult to carry a large gun, it is difficult to load it, and more difficult still to fire it when the ship is rolling about, or is stranded, and the decks washed by the sea, and as regards a rocket it is, even if it can be fired from the deck of a small coaster that is almost awash, almost impossible (owing to the short rolling and bumping of the ship) to keep it in such a position that when fired it shall go straight up or nearly straight up. To meet all the objections against flames, guns and rockets, the schedule to the Act and the original proposals include shells fired from a mortar, and in this direction a means of making the statutory signal of distress has been discovered, to which we desire to call the attention of our readers.

The Cotton Powder Company of Faversham inform us they manufacture sound rockets for the Trinity Corporation which are employed at fog-signal stations on the coast instead of the 18-pounder guns which have hitherto been in use. And the Company, availing themselves of the knowledge and experience gained in the process of manufacture, and at the trials for the Trinity House, emboldened also by the great safety of cotton powder or tonite over other explosive compounds, and by their success in the matter, have turned their attention to making signals of distress for merchant ships. The signal they have devised is one that can be used on a ship of any size, however small or however large, and can be discharged without the application of fire. It may be described shortly as a shell or maroon of two inches in diameter, which bursts like a

rocket, and is capable of making itself seen seven miles, and heard a great distance, thus combining the two essentials, viz., light and sound. It is fired from a socket two inches bore and eight inches deep. In our opinion it is so light, manageable, and inexpensive, that shipmasters, especially those of emigrant ships, passenger ships, and coasting steamers, would do well to place a pair of them on board their ships. We think it probable that these signals may supersede the cumbrous and old-fashioned gun as a signal of distress in all but large ships; and also will ere long take the place of rockets: whilst the smaller ships and coasters, which have not hitherto possessed the means of making signals of distress, will have it within their power to do so by using these signals, which will serve the double purpose of making the sound signal of a gun and the light signal of a rocket.

We learn that the Chinese Government have ordered a quantity of these signals for their four gunboats which are shortly to leave for China.

CORRESPONDENCE.

ON THE ACTION OF THE SCREW-PROPELLER.

To the Editor of the "Nautical Magazine."

DEAR SIR,—Being in possession of your valuable May number of the *Nautical Magazine* of this year, I notice a communication, signed "W. C., Glasgow, March, 1879, On the Action of Screw-Propellers, and Useful Notes for Masters and Officers of Screw Steamers."

Your correspondent's reply to his second query, I think he would find in actual practice, an erroneous one. He says that "a RIGHT-handed propeller, going continuously ahead, will turn a vessel round faster under the *starboard* than under the port helm."

This evening on which I am writing, the weather is perfectly calm, the sea smooth as a pond, and my ship steaming eleven knots through the water, having a *right-handed propeller* making fifty-nine revolutions per minute, and the ship carrying a continuous *starboard* helm. I had the helm put *exactly*

amidships, with orders to keep it there. Soon the ship's head commenced to go to *starboard*, and continued to go that way, veering *four* points of the compass in exactly ten minutes of time, and if I could have afforded it, and so given the ship sufficient time, she would have described a complete circle, turning her head to starboard, with helm placed *exactly amidships*. Of course, I then had to give her starboard helm to counteract this action of the propeller, and bring her back to port, and on to the compass point that I was before steering.

Such a test, I think, is convincing that a ship, having a *right-handed* propeller, and going continuously ahead, the natural action of that propeller is to turn the ship's head to *starboard*, and that movement would be very much accelerated by giving the ship *port helm*.

His remark, suggesting that when having a right-handed propeller it is best to cant the ship with her head to starboard, especially when being obliged to turn short round and *to reverse*, I quite agree with.

I am, Sir, yours respectfully,

A. H. BURWELL,

May 29th, 1879. Master s.s. *Minnesota*.

EXAMINATION OF EXTRA MASTER.

To the Editor of the "Nautical Magazine."

SIR,—In your Official Log of the March number of the *Nautical Magazine* for 1876, page 292, you state that the Board of Trade have issued a draft circular to the Local Marine Boards, in which it is proposed to allow candidates to pass the extra masters' examination at the same time as the ordinary masters, and that an indorsement to that effect would be made on his ordinary master's certificate, although the extra certificate would not be issued until after the candidate had served two years as master, and produced satisfactory testimonials. This circular, I presume, has come into effect, as I have just passed the extra master's examination immediately after passing as ordinary master, but to my surprise, on going to the shipping office I found my certificate returned to me without any indorsement.

On enquiry at the Local Board, and also at the office of the Registrar-General of Seamen, I find that they have no authority for such indorsement, and the only thing I have to show for my trouble is the examiner's authority for use to receive the extra certificate after I have served two years as master. Could you inform me if such indorsement has ever been made, or if there is any authority for doing so?

As the extra certificate is only an honorary one, similar to steam and compass deviation, for which I have an indorsement on my certificate, I do not see why I should not get some acknowledgement for the trouble and expense I have been put to in passing.

Your notice states that the object is to encourage young officers to study navigation and the various subjects bearing upon their profession. If the facts were made known it might deter others from going to a deal of trouble and expense to acquire that which is practically of no value.

I remain, Sir,

Lewisham, Your obedient servant,

June 12, 1879. HENRY PYBUS.

[We are sure that the draft circular, issued by the Board of Trade in 1876, was as inserted in the Magazine, but are not so positive as to whether the printed circular, subsequently issued, was precisely to the same effect, though we have every reason to suppose it was intended to be. We have heard before of the grievance to which our correspondent refers. At present, a candidate presents himself for the ordinary and extra certificate, as he is permitted to do; but, having passed his examination, he is given an ordinary master's certificate, without any recognition of his having also passed as extra. Should another candidate merely pass the ordinary examination, and subsequently take the "Deviation Syllabus," this candidate's certificate is endorsed to the effect that he has passed in the Syllabus. Thus the latter, who has really passed the less examination, appears to stand higher than the former, and this, we have reason to believe, only requires to be represented to the Board of Trade to be rectified, as we know that the Board is desirous that young officers should take as high a status as they can.—Ed. *N. M.*]

WEATHER FORECAST FOR JULY, 1879.

THE CURRENTS OR TENDENCY OF THE AIR OVER THE BRITISH ISLANDS FOR THE MONTH OF JULY, 1879.

Date.	Duration.	Force from		General Direction from	Duration.	Force from		General Direction from
July		N. or S.	E. or W.			N. or S.	E. or W.	
1	... ...	...	...	...	2 h.a. to 2 h. fol. m.	3	4	W.S.W.
2	2 h.m. to 3 h.a.	4	9	E.N.E.	3 a. „ 5 „	2	4	„
3	5 m. „ 6 a.	0	11	E.	6 a. „ 4 „	0	5	W.
4	4 m. „ 5 a.	4	10	E.S.E.	5 a. „ 4 „	2	5	W.N.W.
5	5 m. „ 4 a.	7	9	„	4 a. „ 8 „	3	4	„
6	8 m. „ 3 a.	9	8	S.E.	3 a. „ 9 „	4	4	N.W.
7	9 m. „ 3 a.	11	7	S.W.	3 a. „ 9 „	5	3	„
8	9 m. „ 4 a.	11	8	„	4 a. „ 10 „	5	4	„
9	10 m. „ 5 a.	11	8	„	5 a. „ 11 „	5	4	„
10	11 m. „ 5 a.	11	8	„	5 a. „ fol. noon	5	4	„
11	Noon „ 7 a.	10	9	„	7 a. „ „	5	4	N.E.
12	„ „ 8 a.	9	10	„	8 a. „ „	4	5	„
13	„ „ 9 a.	8	10	W.S.W.	9 a. „ 1 fol. a.	4	5	E.N.E.
14	1 a. „ 11 a.	6	11	„	11 a. „ 2 „	3	5	„
15	2 a. „ 1 fol. m.	4	11	„	... ...	...	...	...
16	2 a. „ 3 „	1	12	W. by S.	1 m. „ 2 a.	0	6	E.N.E.
17	3 a. „ 3 „	1	12	W. by N.	3 m. „ 3 a.	0	6	E. by N.
18	3 a. „ 4 „	4	11	W.N.W.	3 m. „ 3 a.	2	5	E. by S.
19	3 a. „ 7 „	6	10	„	4 m. „ 3 a.	3	5	E.S.E.
20	2 a. „ 7 „	9	9	N.W.	7 m. „ 2 a.	4	4	S.E.
21	2 a. „ 8 „	11	7	N.N.W.	7 m. „ 2 a.	5	3	S.S.W.
22	3 a. „ 9 „	11	7	„	8 m. „ 3 a.	5	3	„
23	3 a. „ 10 „	12	6	„	9 m. „ 3 a.	6	3	„
24	4 a. „ 11 „	12	6	„	10 m. „ 4 a.	6	3	„
25	5 a. „ 11 „	11	7	N.N.E.	11 m. „ 5 a.	5	3	„
26	7 a. „ 11 „	10	7	„	11 m. „ 7 a.	5	3	„
27	9 a. „ fol. noon	8	8	N.E.	11 m. „ 9 a.	4	4	S.W.
28	11 a. „ „	5	8	E.N.E.	Noon „ 11 a.	2	4	W.S.W.
29	... ...	...	...	...	Noon „ 2 fol. m.	1	5	W. by S.
30	2 m. „ 2 a.	1	10	E. by N.	2 a. „ 2 „	0	5	„
31	2 m. „ 1 a.	2	11	E.S.E.	1 a. „ 4 „	1	5	W.N.W.

NOTE.—Sun's gradients S. Westerly becoming N. Westerly towards the end of month.

Daily change due to Sun occurs between 1 a. and 2 a.

Moon's maximum S. declination on the 2nd = 26° 4′ increased 1′

„ „ N. „ „ 16th = 25° 6′ „ 2′

„ „ S. „ „ 29th = 26° 5′ „ 1′

REMARKS.

1. The Table indicates — Probable Winds.

Tendency		From		To	In the North.	In the South.
Strong N. Easterly	tendency from the	1st	to the	3rd,	Moderate to fresh Wly. to	N. Wly.
„ S. Easterly	„	4th	„	6th,	Moderate Wly. to Nly.	Nly. to Ely.
„ S. Westerly	„	7th	„	10th,	Do. do.	do.
„ S. Westerly	„	11th	„	16th,	Light variable Wly. to	Nly. (on the 15 & 16)
„ N. Westerly	„	17th	„	24th,	Moderate to fresh, Nly. to	Ely.
„ N. Easterly	„	25th	„	30th,	Do. do. S. Ely. to	S. Wly.
„ S. Easterly	„	31st			Do. do. do.	do.

Possible gale when strong force from North diminishes about the 27th and 28th.

2. Moon going South 1st and 2nd.
   „ coming North, from the 3rd to the 16th.
   „ going South „ 17th „ 29th.
   „ coming North, 30th and 31st.

3. Change from the Easterly to the Westerly tendency about the 7th.
   „ „ Westerly „ Easterly „ „ 25th.
   A minor change takes place about the 11th and 21st.

4. General Forecast:—
   1st to the 3rd, Unsettled, cold and wet.
   4th „ 10th, Generally fine. Temperature rising and high.
   11th „ 16th, Rather unsettled with thunderstorms.
   17th „ 24th, Generally fine.
   25th „ 31st, Very unsettled and wet, with frequent thunderstorms. Temperature generally high.

5. It will be observed that the force from the North is still greater than that from the South. These forces are, however, gradually becoming equalised. The prevalence of northerly and easterly winds experienced during the past six months have been due to a combination of causes.

1st. The strongest force has been from the North as the Tables clearly show.

2nd. The Moon's sphere of action has been rapidly contracting, that is to say, its maximum declination North and South has been diminishing; there is, however, a slight increase during this month.

3rd. The rotatory velocity has been high.

6. The retrograde movements during the equinoctial and solstitial periods are caused by the contraction and steepening of the great gradients, consequent on the increased rotatory velocity at these times. These movements must be carefully distinguished from the progressive movements which follow the varying declination of the Sun. During March and May-June, the retrograde is opposed to the progressive, but during September and November-December these movements are combined. Similar retro-

grade movements, on a smaller scale, will occur when the Moon crosses the Equator, and when it approaches its maximum northern and southern declination.

After these periods of contraction an expansion owing to reaction, naturally takes place. Thus we have a contraction during November-December, and this is combined with the ordinary motion southwards; this contraction continues during part of January, but it is opposed by the progressive motion northwards; an expansion occurs in February, a contraction in March, an expansion in April, a contraction in May-June, and an expansion in July, but this latter is opposed by the ordinary motion southwards.

These retrograde movements are accelerated or retarded, increased or diminished according as they are combined with, or opposed to, those caused by the Moon.

D. D.

Canal Across the Florida Peninsula.—The projection of a canal across the Florida peninsula is again spoken of as a good speculation, and as a means of more effectually opening up the riches of the Mississippi valley. From Matanzas-Sulet, on the Atlantic, to Fort Wool or Clay Landing, on the Suwanee river, its length would not exceed seventy-five miles; it would be well supplied with water from the numberless small streams and watercourses with which the peninsula abounds, and there would be a good port at each outlet. The distance between New York and New Orleans, by the way of the canal, would be shortened by 1,000 to 1,200 miles; but this does not represent the only gain; there would be the enormous saving of life and property effected by avoiding the many dangers of the route *viâ* Florida strait, where the weather is always bad, and the current, out of the stream, more or less capricious. It is also said that owing to the lack of economical transport the annual waste of the produce of the Mississippi valley is beyond estimate, but that it would find its way to a profitable market through the Florida canal. The revenue of this canal would also be further augmented as soon as the Darien canal placed the Gulf of Mexico in closer relation with California, Japan and China.

TIDE TABLES FOR JULY, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields A.M.	North Shields P.M.	Leith. A.M.	Leith. P.M.	Devon-port. A.M.	Devon-port. P.M.	Dover. A.M.	Dover. P.M.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.	Liver-pool. A.M.	Liver-pool. P.M.	Green-ock. A.M.	Green-ock. P.M.	Queens Town A.M.	Queens Town P.M.	Kings-town. A.M.	Kings-town. P.M.	London Derry. A.M.	London Derry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Tu	1	11 5	11 40	3 18	3 58	0 24	0 56	11 49	—	2 27	3 3	8 4	8 39	3 29	4 11	8 27	9 0	9 1	9 37	1 51	2 29	8 13	8 49	5 14	5 41	0 49	1 24
W	2	—	0 14	4 27	4 57	1 27	1 56	0 21	0 50	3 38	4 11	9 12	9 43	4 49	5 23	9 30	9 58	10 10	10 40	3 3	3 34	9 23	9 53	6 10	6 39	1 55	2 24
Th	3	0 45	1 15	5 25	5 53	2 24	2 50	1 19	1 47	4 42	5 11	10 13	10 42	5 55	6 26	10 26	10 53	11 10	11 39	4 4	4 32	10 19	10 44	7 8	7 33	2 51	3 18
F	4	1 43	2 9	6 21	6 48	3 15	3 40	2 11	2 39	5 38	6 3	11 11	11 38	6 53	7 19	11 19	11 44	—	0 7	4 59	5 25	11 8	11 32	8 2	8 24	3 44	4 9
S	5	2 34	2 58	7 13	7 37	4 5	4 28	3 2	3 24	6 27	6 50	—	0 3	7 43	8 5	—	0 8	0 32	0 57	5 50	6 13	11 56	—	8 45	9 6	4 33	4 55
S	6	3 22	3 45	7 59	8 20	4 51	5 13	3 46	4 8	7 10	7 29	0 28	0 52	8 26	8 46	0 31	0 53	1 21	1 42	6 35	6 56	0 19	0 42	9 27	9 47	5 16	5 36
M	7	4 6	4 28	8 41	9 2	5 35	5 56	4 30	4 51	7 48	8 7	1 15	1 37	9 5	9 23	1 14	1 34	2 8	2 23	7 16	7 36	1 4	1 26	10 6	10 25	5 56	6 16
Tu	8	4 49	5 8	9 22	9 42	6 17	6 38	5 11	5 32	8 26	8 43	1 57	2 17	9 41	9 58	1 53	2 12	2 43	3 2	7 55	8 14	1 46	2 6	10 45	11 6	6 36	6 56
W	9	5 27	5 46	10 2	10 21	6 58	7 18	5 53	6 14	8 59	9 15	2 37	2 57	10 13	10 28	2 31	2 50	3 21	3 39	8 31	8 48	2 26	2 46	11 29	11 53	7 15	7 34
Th	10	6 6	6 26	10 40	11 2	7 38	8 0	6 35	6 56	9 31	9 48	3 15	3 33	10 43	10 59	3 8	3 27	3 57	4 16	9 5	9 21	3 6	3 27	—	0 18	7 53	8 13
F	11	6 46	7 7	11 26	11 52	8 23	8 49	7 19	7 44	10 7	10 29	3 52	4 12	11 18	11 40	3 47	4 10	4 35	4 56	9 43	10 4	3 49	4 14	0 47	1 17	8 35	8 59
S	12	7 29	7 52	—	0 20	9 17	9 47	8 11	8 40	10 53	11 20	4 33	4 55	—	0 4	4 35	5 8	5 20	5 46	10 29	10 59	4 41	5 8	1 50	2 23	9 26	9 55
S	13	8 17	8 47	0 48	1 17	10 19	10 51	9 12	9 45	11 50	—	5 22	5 50	0 33	1 4	5 36	6 11	6 14	6 45	11 30	—	5 37	6 8	2 56	3 27	10 28	11 4
M	14	9 22	10 0	1 47	2 19	11 24	11 59	10 18	10 51	0 23	0 58	6 21	6 57	1 39	2 17	6 48	7 26	7 19	7 56	0 5	0 41	6 39	7 12	3 58	4 28	11 43	—
Tu	15	10 36	11 11	2 52	3 25	—	0 31	11 21	11 55	1 37	2 12	7 33	8 7	2 54	3 31	8 0	8 32	8 31	9 4	1 18	1 54	7 45	8 17	4 55	5 20	0 20	0 52
W	16	11 45	—	3 57	4 27	1 1	1 29	—	0 23	2 47	3 22	8 39	9 6	4 7	4 39	9 1	9 27	9 36	10 4	2 27	2 56	8 48	9 17	5 44	6 7	1 23	1 51
Th	17	0 16	0 44	4 54	5 17	1 53	2 16	0 47	1 10	3 51	4 22	9 32	9 57	5 9	5 37	9 50	10 12	10 30	10 54	3 23	3 48	9 43	10 7	6 30	6 53	2 15	2 38
F	18	1 8	1 29	5 39	6 0	2 38	2 58	1 33	1 54	4 47	5 8	10 20	10 43	6 2	6 26	10 33	10 54	11 17	11 40	4 11	4 32	10 27	10 45	7 15	7 36	2 59	3 19
S	19	1 49	2 10	6 21	6 41	3 16	3 35	2 14	2 33	5 29	5 49	11 4	11 25	6 46	7 6	11 13	11 32	—	noon	4 52	5 12	11 3	11 21	7 56	8 14	3 39	3 59
S	20	2 29	2 48	7 1	7 21	3 53	4 12	2 51	3 9	6 9	6 29	11 46	—	7 26	7 46	11 51	—	0 20	0 40	5 32	5 52	11 40	11 59	8 32	8 49	4 18	4 36
M	21	3 6	3 24	7 40	7 58	4 31	4 50	3 27	3 45	6 49	7 7	0 6	0 26	8 4	8 22	0 10	0 29	1 0	1 18	6 12	6 30	—	0 18	9 5	9 22	4 54	5 12
Tu	22	3 44	4 3	8 16	8 34	5 9	5 28	4 3	4 22	7 25	7 43	0 46	1 6	8 40	8 58	0 48	1 7	1 37	1 56	6 48	7 7	0 37	0 57	9 40	9 58	5 30	5 49
W	23	4 23	4 42	8 53	9 13	5 48	6 8	4 42	5 2	8 2	8 21	1 26	1 47	9 15	9 33	1 26	1 45	2 15	2 34	7 26	7 46	1 17	1 37	10 16	10 36	6 8	6 27
Th	24	5 1	5 21	9 33	9 53	6 28	6 49	5 22	5 44	8 40	9 0	2 8	2 29	9 51	10 9	2 4	2 24	2 53	3 13	8 6	8 26	1 57	2 18	10 57	11 20	6 47	7 9
F	25	5 42	6 2	10 14	10 38	7 11	7 36	6 7	6 32	9 19	9 39	2 51	3 13	10 28	10 47	2 44	3 6	3 33	3 56	8 46	9 8	2 41	3 5	11 50	—	7 33	7 57
S	26	6 25	6 48	11 4	11 34	8 3	8 32	6 58	7 26	10 2	10 27	3 36	4 0	11 7	11 31	3 30	3 56	4 19	4 43	9 31	9 56	3 30	3 56	0 22	0 55	8 22	8 49
S	27	7 13	7 40	—	0 6	9 3	9 38	7 58	8 32	10 55	11 25	4 25	4 51	11 59	—	4 21	4 56	5 10	5 39	10 23	10 56	4 28	5 2	1 32	2 13	9 18	9 58
M	28	8 11	8 48	0 39	1 15	10 16	10 56	9 11	9 51	—	0 1	5 20	5 56	0 31	1 10	5 33	6 17	6 13	6 51	11 33	—	5 36	6 14	2 58	3 33	10 34	11 19
Tu	29	9 27	10 10	1 58	2 31	11 36	—	10 30	11 9	0 40	1 22	6 34	7 16	1 58	2 37	7 8	7 44	7 33	8 15	0 19	1 2	6 52	7 30	4 8	4 42	—	0 8
W	30	10 54	11 37	3 10	3 49	0 16	0 53	11 47	—	2 5	2 48	7 59	8 37	3 23	4 6	8 24	8 59	8 56	9 35	1 46	2 26	8 9	8 47	5 12	5 41	0 44	1 21
Th	31	—	0 14	4 25	4 56	1 26	1 55	0 20	0 49	3 31	4 8	9 16	9 40	4 45	5 20	9 29	9 57	10 8	10 38	3 0	3 31	9 21	9 51	6 9	6 37	1 58	2 22

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, — *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 18	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 8	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 8	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 28	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 58	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

SHIPBUILDING, 1879.

Sailing Ships.

Ports.	No. of Ships first three months.	No. of Ships corresponding period last year.	Gross Tonnage first three months.	Gross Tonnage corresponding period last year.
Banff	—	3	—	795
Barrow	2	1	117	278
Belfast	1	1	211	1,719
Bristol	1	—	119	—
Cowes	2	1	91	72
Dartmouth	9	14	476	916
Dundee	—	1	—	326
Faversham	7	7	299	362
Glasgow	4	17	3,449	18,857
Greenock	—	1	—	1,776
Grimsby	3	9	200	655
Hull	1	15	77	1,135
Jersey	1	—	69	—
Liverpool	—	7	—	4,983
London	10	13	451	578
Plymouth	3	6	114	391
Port Glasgow	4	2	5,349	1,180
Portsmouth	2	1	378	46
Rochester	5	6	199	227
Rye	4	8	173	473
Southampton	2	—	44	—
Sunderland	—	5	—	2,979
Whitehaven	—	1	—	1,071
Workington	1	—	1,068	—
Yarmouth	8	7	403	371
Other Ports	30	52	2,181	4,839
Total Sailing	100	178	15,468	44,024

SHIPBUILDING, 1879.

Steamships.

Ports.	No. of Ships first three months.	No. of Ships corresponding period last year.	Gross Tonnage first three months.	Gross Tonnage corresponding period last year.
Glasgow ...	22	... 19	... 26,050	... 16,510
Greenock ...	6	... 4	... 4,219	... 3,912
Port Glasgow	4	... 5	... 2,831	... 3,028
Sunderland	13	... 11	... 19,888	... 14,060
Newcastle ...	16	... 15	... 21,206	... 19,197
North Shields	3	... 7	... 2,193	... 3,039
South Shields	2	... 5	... 2,197	... 2,712
Liverpool ...	4	... 3	... 6,905	... 2,029
Dundee ...	2	... 2	... 1,670	... 2,379
Hartlepool ...	6	... 8	... 9,121	... 11,277
Aberdeen ...	1	... 3	... 1,004	... 1,688
London ...	4	... 5	... 335	... 254
Belfast ...	2	... 1	... 3,318	... 3,348
Stockton ...	4	... 5	... 5,961	... 5,988
Middlesbro'	1	... 1	... 1,200	... 2,168
Whitby ...	1	... 2	... 1,984	... 3,212
Barrow ...	1	... 4	... 3,692	... 3,547
Southampton	1	... 1	... 1,865	... 1,029
Leith ...	1	... 1	... 31	... 779
Other Ports	9	... 8	... 2,082	... 674
Total Steam	103	... 110	... 117,702	... 100,825
Total Sailing	100	... 178	... 15,468	... 44,024
Grand Total	203	288	133,170	144,849

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

1963. Henry Studdy, Waddeton Court, Devonshire. Commodore, Royal Dart Yacht Club. "Improvements in apparatus for cleaning the bottoms and sides of ships, and for facilitating the covering of holes or fractures caused by collisions or otherwise in ships' bottoms."

2032. James Sample, Blyth, Northumberland. "An improved governor for marine and land engines."

2037. Gustav A. C. Bremme, Liverpool. "Improvements in steam and other steering gear for ships and navigable vessels, parts of which are applicable to motive power engines."

2057. John Fisher, Southampton Buildings, Middlesex. "Improvements in the construction of and in the method of driving screw-propellers."

2082. Thomas B. Heathorn, Knightsbridge, Middlesex. "Improvements in apparatus for steering ships, vessels, boats and torpedoes, and for checking their speed."

2103. William E. Carlile, Liverpool. "Improvements in and relating to ships' logs, or apparatus for ascertaining, and if necessary recording, the speed of vessels through the water."

2113. Charles F. Henwood, Budge Row, London, Naval Architect. "Improvements in the mode of and arrangements for attaching sheet, zinc, or other suitable electro-positive metal or alloy, as a sheathing to the hulls of iron or steel ships and steam vessels, and to submerged or partially submerged fixed or floating iron or steel structures, for preventing corrosion and fouling, applicable also for attaching together other sheet metals or parts for other uses."

2136. Robert Gillies, High Holborn, Middlesex. "Improve-

ments in and relating to berths or cots for use on ship-board and in other places."

2180. Jorgen C. Krogh, Liverpool, Master Mariner. "Improvements in apparatus for cleaning the bottoms of ships afloat." (Complete specification.)

2260. William Coppin, Camberwell New Road, Surrey. "Improvements in raising sunken vessels, parts of which invention are applicable to other purposes."

2268. Carl O. Ramstedt, Finland, Russia. "Improvements in the means and apparatus for signalling by means of lights on board ships."

2270. George J. Stevens and John S. Smith, Blackman Street, Borough, Surrey. "Improvements in screw-propellers for propelling vessels, applicable also for raising and forcing fluids."

2280. Jean L. Nevers, Pass Christian Harrison, U.S.A. "Improvements in apparatus for propelling vessels." (A communication.)

2286. Thomas and William H. Wilson, Liverpool, Paint Manufacturers. "Improvements in compositions for coating the bottoms of ships and submerged structures."

2316. James B. Mannix and William S. Cox, Limerick, Ireland, Civil Engineers. "Improvements in self-acting flood gates, sluices, or turning gates."

2355. William Y. Fleming and Peter Ferguson, Paisley, Renfrew, N.B. "Improvements in apparatus for steering ships or other navigable vessels and road engines."

2358. John Collis Browne, Leadenhall Street, London, Physician. "Improvements in ships or vessels."

2384. James Sample, Blyth, Northumberland. "An improved automatic disconnecting gear for ships' boats."

2388. William Coppin, Camberwell New Road, Surrey. "Improvements in the construction of ships."

BELGIAN.

47997. A. Wilkinson and J. Hardinge. "Improvements connected with the manufacture of reflectors for ships', railway, and other lamps, or lighting vehicles; said manufacture being applicable for advertising and other tablets."

48018. G. de la Marronnière. "A propeller for steamers, torpedo boats, &c."

CANADIAN.

9387. John W. McRae, Ottawa. "Improvements on canal boats."

9443. David Brooks, Philadelphia, U.S.A. "An improvement in insulating telegraph wires, and laying telegraph cables."

9477. Edwin Town, Wilmington, U.S.A. "Improvements in screw-propellers."

9573. Josiah L. Clark and John Standfield, Westminster. "Improvements in floating docks."

9576. William Hewitt, Hamilton. "Improvements in canal boats."

9598. Godfrey J. Rudolph, Liverpool. "Improvements on ships carrying cattle."

9724. Ellis Cutlan, London. "An apparatus for cleaning the bottoms of ships."

FRENCH.

128012. Vivers. "Improvements in shutters for closing the side-lights and other openings in ships and vessels."

128137. Buteux. "Boxes or Chinese cabins for sea-bathing and gardens, &c.

128144. Hulster. "Improvements in vessels."

128152. Cazaux. "A compressed air apparatus for increasing the speed of vessels."

GERMAN.

6112. P. Jacquel, Natzweiler. "Bedding ships' propellers in a bifurcated hollow cylinder for steering purposes."

ITALIAN.

2. L. J. Guano, Genoa. "A new type of armour-plated vessels, provided with an apparatus for increasing the speed of steamers, and with a large reservoir of compressed air."

46. H. de Burgh-Lawson, London. "Propelling vessels."

80. J. F. Chauffaud, Bordeaux, and G. C. Barbotin, Ares. "Hammock buoys (safety buoys)."

193. W. Giese, Bordeaux. "A submarine torpedo rocket."

NORWEGIAN.

40. J. Pintsch, Berlin. "An apparatus for illuminating the course of ships at sea by gas."

76. C. G. Von Otler, Stockholm. "Signal apparatus for vessels."

PATENTS PUBLISHED.

3497. John Isaac Thornycroft, Church Wharf, Chiswick, Steam Yacht and Launch Builder. "Improvements in or connected with the steam generating apparatus of ships or vessels." The object of this invention is to lessen the risk of injury to persons in the stoke holes of ships in the event of steam escaping into the boiler furnaces, owing to the bursting of boiler tubes or other leakage. For this purpose passages or conduits are arranged in communication with the ashpits or pans, and with the open air, which passages are provided with suitable doors, to be kept normally closed, but capable of being readily opened to allow of the escape of steam or heated gases in the event of any sudden and undue increase of pressure within the furnace flues, ashpit, or pan, arising from leakage out of the boiler.

4082. Edward Gardner Colton, of the office of Wm. P. Thompson & Co., Patent Agents. "Improvements in and appertaining to apparatus for attaching to, suspending, and disengaging or detaching ships' boats or similar bodies from the lowering tackle." (A communication to him in trust by Henry Ashford, Philadelphia, U.S.A.) This invention relates to the construction of mechanism for instantly releasing a boat simultaneously at both ends from the tackle blocks suspended from the davits, or other means of suspension of the boat, also for retaining the disengaging hooks in position and causing their subsequent automatic engagement with the tackle blocks. To each end of the keel of the boat is attached an upright standard, to the upper end of which is pivoted a disengaging hook, kept in position by the end of a vertically extending elbow lever pivoted below it pressing against its heel by means of a weight, the front portion of the hook being closed by a latch also kept in position against the hook by the weighted lever. When the boat reaches the water, a lever, mounted on a standard in the

centre of the boat is raised, which lifting a lazytongs connected with the upper end of the weighted elbow lever by a rod extending to a small elbow lever pivoted at the base of each end standard and thence by a chain, turns the weighted elbow lever on its pivot releasing the heel of the disengaging hook, which, immediately turning on its pivot, releases the tackle, setting the boat free.

4145. George Ruxton, Liverpool, Master Mariner. "Improvements in and appertaining to chocks for ships boats, and in the mode of putting out said boats." This invention is designed to obviate the difficulty and trouble of hoisting on the falls in putting out boats from ordinary chocks, and consists in keying the inside of the two chocks, placed on wooden supports, by wedge-shaped keys driven from each side elevating the chock to a considerable height from the main support; by knocking out the keys the chock is lowered and falls off, the boat thus relieves herself from the outside chock, which falls down, leaving the boat in the falls; the davits are then swung round, and she is lowered in the usual manner. By this plan of fitting the chocks the falls do not require to be hoisted on after the chocks are released, as at present. To secure the boat, she is hoisted up and swung inboard, and the chocks and keys being placed and held in position, she is lowered on to them.

4221. Maximillian Stanislaus Hassfield, London Wall, London. "Improvements in or applicable to apparatus and fittings for effecting and facilitating the steering and propulsion of vessels, parts whereof are applicable to other purposes." (A communication to him in trust, by Jacob Joachim Kunstädter, Budapest, Hungary.) This invention relates to certain improvements upon a previous invention for apparatus for effecting the steering of vessels and facilitating their propulsion by means of a screw-propeller, mounted in the rudder of the vessel; the outer portion of the shaft, carrying the steering screw-propeller, being connected to the main propelling shaft by means of a universal joint; and consists in an improved construction, fitting, and application of joints, and means for relieving the coupling joint from the end thrust of the steering propeller. In one form of improved joint

there are employed two studs or pivot pieces, which are centrally cut away through half their thickness, so as when laid together crosswise they shall form an interlocking arrangement of four pivots or arms. These pieces are passed through the holes or eyes at the extremities of the adjacent double-eyed forks of the shafts to be coupled, and plates, grooved at right angles correspondingly to the interlocking joint-pins, are provided, which are to be bolted together upon and to secure the interlocking pivot pieces between the plates. In a modified arrangement of the joint, the pins of the joint are made dovetail in shape, or they may be screwed and grooved at their inner ends. The propeller is sometimes constructed with the joint working within its boss, which arrangement is more adapted for light craft.

4394. Robert B. W. H. I. Duncan, Friday Street, Leicester, Shipbuilder. "Improvements in the construction of ships, and in apparatus in connection therewith for saving life at sea." The bulwarks of ships are, according to this invention, constructed with buoyant panels, securely fixed between the stanchions and top-rail, but in such a manner that, at any time when required for use, they can at once be liberated by the withdrawal of suitable bolts. The panels consist of frames, filled in with metal tubes, or with cork or other buoyant material and boarded over, so that when in place they form a close bulwark, and when in the water a life-preserver or raft. These panels are capable of being used separately, each to support a small number of persons, or being connected together to form a larger raft, capable of carrying a large number of persons. Similar panels may also be employed, fitted between uprights, to form deck-houses and other structures on shipboard. In each case they are provided with fastenings, which, whilst they serve to retain them securely until the emergency arises, can be immediately undone.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
182	English Channel.—Alderney	Leading beacons on breakwater.
183	England—East Coast—Souter Point	Alteration of fog-signal.
184	„ West Coast—Lynus Point	Telegraph station removed.
185	„ „ Milford Haven	Torpedo ground in Sand Haven bay.
186	Ireland—Cork Harbour—Poor Head	New fog-signal.
187	Baltic Entrance — Belts — Aarhus Harbour	Alteration in lights.
188	Gulf of Bothnia — West Finngrund Bank	New shoal.
189	France—West Coast—Gironde River	Temporary alteration in lights.
190	Portugal—West Coast—Tagus River—Guia	Temporary alteration in light.
191	Mediterranean—Spain—Villanueva and Geltrú	Alteration in light.
192	„ France—Marseille	New provisional lights.
193	Adriatic—Trau Channel—Trau	Alteration in light.
194	„ Trieste Bay—Grado	Temporary discontinuance of light.
195	„ Trieste—The New Port	New lights.
196	Mediterranean—Corfu—Madonna Shoal	Buoy adrift.
197	„ Greece—Salamis Bay	Temporary light.
198	Sea of Azov—Bielosarai Spit	Alteration in light.
199	„ Petchany Light-vessel	Alteration in light.
200	South Atlantic—Ascension Island	Wreck off George Town.
201	Eastern Archipelago—Sourabaya	Withdrawal of light-vessels, and new leading lights established.
202	South Australia—Port Broughton—Spencer Gulf	Buoys marking a new channel.
203	„ „ Commissariat Point—Spencer Gulf	New buoy on spit.
204	Australia—Queensland—Keppel Bay	Obscured arc of Little Sea Hill light.
205	New Zealand—North Island—Cape Maria Van Dieman	New light.
206	United States—Delaware River—Reedy Island	Re-exhibition of light.
207	„ Hudson River — New York	New lights.
208	Newfoundland—South Coast—Placentia Harbour—Verde Point	New light.
209	Canada—St. Lawrence River—Saguenay River	Discontinuance of lights.
210	„ Quebec to Montreal	Altered light in new channel.

NAUTICAL NOTICES.

182.—English Channel.—*Channel Islands.—Alderney Harbour.—Leading Beacons for Seaward end of Breakwater.*—With reference to previous notice respecting the destruction of the seaward end of

the breakwater at Alderney, two beacons have been erected on the adjacent shore, which kept in line bearing S.S.E. ¾ E. lead clear of the submerged portion of the seaward end of the breakwater. The beacons are as follows :—(1.) On the eastern part of the rock Homet des Pies, Saye bay, an iron pole 25 feet high, surmounted by a round cage. (2.) On the hill above, near King's battery, a wooden pole 36 feet high, surmounted by a triangular cage. *Variation*, 19¼° *W*.

183.—ENGLAND.—*East Coast.—Fog-Signal, Souter Point.*—The character of the fog-signal at Souter point has been changed from one blast every 45 seconds to *one blast every minute.*

184.—ENGLAND. — *West Coast. — Lynus Point. — Telegraph Station Removed to Lynus Point Lighthouse.*—The telegraph station on the hill southward of Lynus point has been closed, and vessels signalling to the station on Lynus point, will be answered from the flagstaff on the east side of the lighthouse.

185.—ENGLAND.— *West Coast. — Milford Haven. — Torpedo Ground in Sand Haven Bay.*—With reference to previous notices on placing and removing the buoy marking the south-western limit, within which torpedo experiments would be made in Sand Haven bay, on the north shore of Milford haven, further notice is given, that the buoy, conical, painted *green* and *white* in horizontal bands, and marked *torpedo mooring ground*, has been replaced in 5 fathoms water, in a line midway between Great Castle head and Stack rock, in readiness for the season's torpedo practice.

Caution.—Mariners are warned not to anchor or pass in shore of the lines joining Great Castle head high lighthouse to Stack rock fort, and thence to the east extreme of South Hook fort. Small vessels bound to or from Sandy Haven pill may pass within the torpedo ground, but should keep on the western shore of Sand Haven bay.

186.—IRELAND.—*South Coast.—Cork Harbour.—Fog-Signal at Poor Head.*—This fog-signal, 3 miles south-eastward of the entrance to Cork harbour, will be established on the 1st July; it will be a siren trumpet, which, during thick and foggy weather, will give *one* blast of *five seconds*' duration every *two minutes.*

187.—Baltic Entrance.—*The Belts.—Aarhus Harbour.—Alterations in Lights on the West Side of Aarhus Bay.*—(1) The fixed red light previously shown from the Northern mole is discontinued, and in place thereof a *fixed green* light is exhibited. (2.) The fixed white light previously shown from the new South mole head is discontinued, and in place thereof a *fixed red* light is exhibited. (3.) The fixed red light previously shown from the old South mole, at the entrance to the harbour basin, is discontinued.

188.—Gulf of Bothnia.—*Shoal on West Finngrund Bank.*—This shoal, on the south-western part of West Finngrund bank, eastern side of Gefle bight, has a depth of 12 feet over it, and is marked as follows:—In a W.S.W. direction, at the distance of $2\frac{1}{4}$ cables, by a perch painted red, carrying a globe and cross bar, placed in 10 fathoms water; and in an E.N.E. direction, at the distance of $2\frac{1}{2}$ cables, by a perch painted black, in 8 fathoms water. Position approximate, lat. 60° 53′ 30″ N., long. 17° 56′ 40″ E. *Variation*, $8\frac{1}{2}$° *W.*

189.—France.—*West Coast.—Gironde River.—Temporary Alteration in Lights.*—The following alterations will be made in the lights near Gironde river entrance:—

Le Grand Banc light-vessel will, on 15th June, 1879, be removed for one month, and Tallais bank light-vessel will be moored in her place, but this latter vessel having only one mast and one light, a light will be suspended from the forestay, 26 feet above the sea, so that the character of the lights exhibited will not be materially changed.

Tallais Bank light-vessel will be replaced on 15th May, 1879, for three months, by Tour de By light-vessel.

Tour de By.—A small sloop will be placed in the position of Tour de By light-vessel (removed), from which a light will be exhibited 26 feet above the sea. This light should be seen from a distance of 6 miles, but in bad weather will be liable to extinction.

190.—Portugal.—*West Coast.—Tagus River Entrance.—Temporary Alteration in Guia Light.*—During the alteration of the illuminating apparatus of Guia light a temporary light, visible in clear weather from a distance of 5 miles, will be exhibited.

191.—MEDITERRANEAN.—SPAIN.—*Alteration in Villanueva and Geltrú Light*—From the 1st July, the light will be a fixed *red* light instead of fixed white as at present.

192. — MEDITERRANEAN. — FRANCE.— *South Coast.—Wreck of Light-Vessel at Marseille.—Provisional Lights Exhibited.*—Owing to the wreck of the light-vessel moored at the north entrance of the new port, the north entrance of the harbour is now marked at night by *three red* lights shown from the mast of a boat *(le Hasard)* moored about 60 yards within the extremity of the great northern pier.

Note.—Vessels entering the north outer port at night will have rounded the extremity of the pier when these lights bear S.S.E. ½ E. —approaching from the southward, these lights should be kept at least 2¾ cables distant until on that bearing. *Variation*, 14½° W.

193.—ADRIATIC.—*Trau Channel.—Alteration in Trau Light.*—The light exhibited near the bridge which joins Bua island to the mainland at Trau, has been changed to a *fixed red* light.

194.—ADRIATIC.—*Trieste Bay.—Temporary Discontinuance of Grado Light.*—To be discontinued, pending repairs of the vessel.

195.—ADRIATIC.—*Trieste.—Lights at the New Port.*—In order to mark the northern entrance of the new port at Trieste, the following lights are exhibited :—Two lights are shown from mole head No. 1, one at each angle : they are *fixed green* lights, showing a sector of *white* light over the bay through an arc of 60°, and are elevated 16 feet above the sea. Also a *fixed red* light (masked towards the breakwater), elevated 10 feet above the sea, is shown from the extremity of the transverse arm of the breakwater.

196.—MEDITERRANEAN.—*Corfu South Channel.—Madonna Shoal Buoy Adrift.*—This buoy, eastward of Paxo island, has been carried away by a recent gale, and mariners are cautioned accordingly.

197.—MEDITERRANEAN.—*Greece.—Salamis Bay.—The Peiræus. —Exhibition of Temporary Light.*—The column at the south side of the entrance to the Peiræus, from which a green light was exhibited, has been destroyed; and a vessel showing a *green* light has been temporarily placed near the position.

198.—SEA OF AZOV.—*Alteration in Bielosarai Light.*—The

fixed white light on Bielosarai spit, northern entrance point to the gulf of Azov, is discontinued, and in lieu thereof two *fixed white* lights will be exhibited.

199.—Sea of Azov.—*Alteration in Petchany Light.*—The fixed white light exhibited from Petchany light-vessel, at the extremity of Sazalnits bank, gulf of Azov, is discontinued, and in lieu thereof two *fixed white* lights will be exhibited.

200.—South Atlantic.—*Ascension Island.—Wreck off George Town.*—The wreck of the British ship, *Sir Charles Napier*, sunk off George town (with heads of topmasts showing above water) is lying in 9½ fathoms, with the following bearings, viz., Pyramid point, N. 74° E.; Pier head, S. 46° E., distant 6¼ cables; Catherine point, S. 5° W. Position, lat. 7° 55′ 10″ S., long. 14° 26′ W.

Note.—A boat, from which a light is shown during the night, is moored seaward of the wreck. *Variation,* 23¼° *W.*

201.—Eastern Archipelago.—*Sourabaya Strait.—Intended Withdrawal of Sourabaya Light-Vessel, and Establishment of Leading Lights.*—It is intended to withdraw Sourabaya light-vessel from her station on Zee bank, Sourabaya strait, and in lieu thereof two fixed leading lights will be exhibited, one at cape Piering, and the other at Slimpil point (near Sembilangan), on the west coast of Madura island.

202.—South Australia.—*Port Broughton, Spencer Gulf.*—A *new channel* has opened out at the entrance to Port Broughton, and has been marked by two perch buoys; one (painted black) lies 440 feet south of the red beacon marking the old entrance, and the other (painted red) lies 310 feet E. ¾ N. from the black buoy. Twenty new cask buoys (painted red) have been moored along the channel, nearly up to the jetty. Vessels coming in should leave them on the starboard hand, and when approaching the entrance should borrow towards the perch buoys, as by passing either of these at a distance of 70 or 80 feet they will avoid a small knoll which lies in mid-channel and has a foot less water upon it. By following the above directions when nearing or crossing the entrance not less than 5 feet at low water will be obtained.

203.—South Australia.—*Commissariat Point.—Spencer Gulf.*—A *perch buoy*, painted black, has been moored on a sand spit

between the two black beacons, Commissariat point, Spencer gulf. Masters of vessels navigating in these waters without a pilot should keep well in mid-channel, as the water in many places shoals suddenly.

204.—AUSTRALIA.—*Queensland.—Kepple Bay.—Little Sea Hill.—Obscured Arc of Upper Leading Light.*—Obscured between the bearings S.E. ½ S. and S.E. ¼ E.

Note.—Timandra bank buoy is painted black. *Variation*, 8½° *E.*

205.—NEW ZEALAND.—*North Island.—North Coast.—Light at Cape Maria Van Diemen.*—On the islet lying about half-a-mile north-westward of cape Maria Van Diemen. It is a *revolving white* light attaining its greatest brilliancy *every minute*, elevated 330 feet above the sea, and visible about 24 miles. From the lower part of the lighthouse, a sector of *red* light, of about 30° in extent, is shown in the direction of Columbia reef. The lighthouse, 20 feet high, is constructed of wood, and painted white. Position, lat. 34° 28′ 30″ S., long. 172° 38′ 40″ E.

206.—UNITED STATES.—*Delaware River.—Re-Exhibition of Reedy Island Light.*—It is a *flashing white* light, showing a flash every *thirty seconds*, elevated 30 feet above high water. The structure is a one-story frame dwelling, surmounted by a small square tower, both painted drab colour, lantern black. Thirty feet of the old tower remains standing, detached from the dwelling, and is white-washed. Position approximate, lat. 39° 30′ N., long. 75° 34′ W.

207.—UNITED STATES.—*Hudson River.—New York.—Stake Light on Dyke at Bear Island and Parada Hook Light Discontinued.*—A *fixed white* light, illuminating the entire horizon, is now shown from a stake 20 feet above mean low water, at the corner of the south end of the Government dyke, on Bear island, west side of the Hudson river; and the light on Parada Hook is *discontinued.*

208.—NEWFOUNDLAND.—*South Coast.—Placentia Harbour.—Light on Verde Point.*—On 1st June, exhibited from a lighthouse recently erected on south side of entrance to Placentia harbour; it is a *fixed white* light, elevated 98 feet above the sea, and visible 11 miles. The tower and dwelling attached are constructed of wood, and painted white. Position, lat. 47° 14′ 10″ N., long. 54° 0′ 20″ W.

209.—CANADA.—*St. Lawrence River.—Saguenay River Entrance.—Discontinuance of Leading Lights.*—The leading lights hitherto exhibited during the season of navigation on point Noir, south side of Saguenay river entrance, would be discontinued from the opening of navigation in 1879.

210.—CANADA.—*St. Lawrence River.—Lights between Quebec and Montreal.*—Improvements in the channels between Quebec and Montreal (recently made and now in progress by the Harbour Commissioners of Montreal), necessitate numerous alterations in the system of lights, which will be altered to show the newly dredged channel of 25 feet. Due notice will be given as these alterations are carried out. The following will be completed before the opening of navigation, 1879 :—

1. GRONDINE.—The present leading lights will be discontinued, and new leading lights, to be known as Grondine Upper Range lights, will be established in the same line of direction as the present upper beacons. The Low Light will be a *fixed* white light, elevated 25 feet above high water, and should be visible in clear weather, when bearing N.E. by E., from a distance of 5 miles. The illuminating apparatus will be catoptric, or by reflectors. The structure, square and standing on a frame platform, is painted white with a vertical red stripe on the side facing the channel ; it is situated south of the main road, and about 2 miles westward of Grondine church. Position, lat. 46° 35′ 25″ N., long. 72° 5′ 55″ W.—The High Light will be situated northward of the main road (on high ground, close to the present southernmost beacon), and N.E. by E. ¼ E., distant 1010 yards from the low light. Pending the completion of the lighthouse, a *fixed* white light will be exhibited from a pole, elevated 57 feet above high water, and should be visible from a distance of 6 miles. On the completion of the lighthouse, the beacons will be removed ; of which, notice will be given.

Note.—Proceeding up the river, these lights should be brought in line after passing Cape Roche shoals, and kept so until the new leading lights at Batiscan come in line. *Variation*, 15¾° *W.*

2. BATISCAN.—The present lights will be moved a short distance north-eastward, and kept in line, will lead from their point of

intersection with Grondine leading lights through the wide part of the channel, clear of St. Anne shoals. The Low Light (fixed white) will be elevated 20 feet above high water, and should be visible on a W. by S. bearing from a distance of 4 miles. The structure, 18 feet high, is octagonal in shape, and stands on a square platform; it is situated 200 yards from the shore, and close to the south-east side of the main road. Position, lat 46° 30′ 35″ N., long. 72° 15′ W.—The High Light (fixed white) will be situated W. by S. ¼ S., distant 680 yards from the Low Light; it will be elevated 42 feet above high water, and should be visible on a W. by S. bearing from a distance of 4 miles.

3. St. Pierre des Becquets.—The improvements in the channel having rendered Pierre point light useless, it will be discontinued.

4. Port St. Francis.—The Low Light will be shown from an octagonal structure on a low pier by the side of the road to the wharf; it will be elevated 14 feet above high water, and should be visible from a distance of 4 miles. Position, lat. 46° 16′ 15″ N., long. 72° 37′ 15″ W.—The High Light is shown from a square open frame, and should be visible from a distance of 4 miles; it is erected on a pier, and bears E. by N. ¼ N., 183 yards from the low light. These lights in line will lead through a channel, which near Batture à Fer is about 50 yards farther south than at present.

5. Lake St. Peter.—The three light-vessels in this lake will be moored at the points of intersection of the fairways of the channels they respectively mark, in the following positions:—East light-vessel (No. 3), lat. 46° 15′ 55″ N., long. 72° 42′ 15″ W.; Centre light-vessel (No. 2), lat. 46° 11′ 25″ N., long. 72° 54′ 10″ W.; West light-vessel (No. 1), lat. 46° 9′ 35″ N., long. 72° 56′ 55″ W.

6. Isle St. Therese upper leading lights will be moved eastward, and placed in the line of direction of the newly dredged channel off point aux Trembles.—The Low Light elevated 13 feet above high water, will be shown from an octagonal structure close to the shore. Position, lat. 45° 40′ 20″ N., long. 73° 28′ W.—The High Light will be situated N.E. by N. distant 400 yards from the low light; and until the lighthouse is completed—of which, notice will be given—it will be shown from a pole, elevated 33 feet above

high water. These lights will be *fixed* white lights, and should be visible in the direction of the channel from a distance of 8 miles. The illuminating apparatus will be catoptric, or by reflectors.

Note.—These leading lights kept in line from their point of intersection with the line of point aux Trembles leading lights, will lead through the deepened channel to the wide passage above point aux Trembles.

7. Point Aux Trembles.—To render these light towers more conspicuous as day beacons, a vertical red stripe will be painted in the centre of each structure on the side facing the channel. *Variation*, 13¼° *W*.

8. Champlain. — The fixed white light is discontinued: and leading lights, known as Champlain Lower Range lights, have been established to lead through Becancour Traverse.—The Low Light is a *fixed* white light, elevated 34 feet above high water. The structure 28 feet high, is square and painted white, with a vertical red stripe on the side facing the channel; it is situated near the river bank, about 400 yards above Champlain church. Position, lat. 46° 26′ 25″ N., long. 72° 20′ 55″ W.—The High Light is a *fixed* white light, situated close to the church, and bears N.E. ½ E., about 250 yards from the low light. Pending the completion of the lighthouse, the high light will be exhibited from a pole, elevated 60 feet above high water. The illuminating apparatus of each of these lights is catoptric, or by reflectors; and they should be visible in the direction of the channel from a distance of 6 miles.

9. Isle St. Therese.—Two beacons, for day marks, have been erected in the line of direction of the new leading lights.

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1879.

No. 9.—China Sea Directoty, Vol. I., Notice 2; information compiled from various authorities, including the Netherlands Government survey, 1871-7; Sumatra, &c.

No. 10.—South American Pilot, Part I., Notice 8; Brazil, and Rio de la Plata.

No. 11.—Pacific Ocean, Notice 47; Fiji islands, Banks group, Solomon islands, and Kermadec islands.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1879.

(*This List is completed to the* 18*th of each Month.*)

274. *Queen of the South;* wood; built at Sunderland, 1855; owned by Messrs. McLaren, of Greenock; tonnage, 336; lost whilst loading a cargo of timber at the mouth of the Chiltepec River, Gulf of Mexico, February 27, 1879. Inquiry held at Greenock, May 8, 1879, before Rothery, Wreck Commissioner; Holt and Ward, N.A. Master and mate free from blame. Certificates returned.

275. *Merchant*, brig; built at Charlestown, Cornwall, 1844; owned by Mr. Tanner, of Lewes; tonnage, 232; Newhaven to Shields; ballast; lost on the Kentish Knock Sand, April 13, 1879. Inquiry held at South Shields, May 1, 1879, before Yorke, Stip. Mag.; Powell and Ward, N.A. Loss not caused by any default of the master. Certificate returned. Mate severely censured (uncertificated).

276. *Hafod*, wood; built at Milford, 1844; owned by Mr. Mabley and others, of Fowey; tonnage, 75; London to Plymouth; patent manure; lost near Dartmouth, February 24, 1879. Inquiry held at Greenwich, May 12, 1879, before Balguy, Stip. Mag.; Forster and Parfitt, N.A. Casualty caused by the perils of the sea, not by any default of master.

277. *Ben Ledi*, s.s.; iron; built at Sunderland, 1873; owned by John Morrison, of North Shields; tonnage, 700; Rotterdam to the Tyne; ballast; lost near Souter Point, April 7, 1879. Inquiry held at South Shields, May 3, 1879, before Yorke, Stip. Mag.; Powell and Ward, N.A. Casualty was not caused by any default of master. Certificate returned.

279. *Robert Dickinson*, s.s.; iron; built at Hebburn, 1879; owned by Bell and Symonds, Newcastle-on-Tyne; tonnage, 1,109; Tyne to Naples; bricks, cement, &c.; lost near Thornwick Nab, April 27, 1879. Inquiry held at North Shields, May 15, 1879, before Rothery, Wreck Commissioner; Pickard and Ward, N.A.

Master to blame for neglecting to steer safe and proper courses. Certificate suspended for six months; recommended for one as mate during that period.

280. *Abrasia*; wood; built at Prince Edward Island, 1875; owned by Mr. McTavish, of Greenock; tonnage, 179; Glasgow to Cape Breton; bricks and pig iron; abandoned at sea, April 20, 1879. Inquiry held at Glasgow, May 17, 1879, before Rothery, Wreck Commissioner; Pickard and Ward, N.A. Abandonment justifiable and not premature. Certificate returned.

288. *Ida;* wood; built at Yarmouth, Nova Scotia, 1859; owned by Mr. McClelland, of Londonderry; tonnage, 571; Londonderry to St. John's; ballast; abandoned at sea, April 12, 1879. Inquiry held at Londonderry, May 24, 1879; before Stokes, Judge; Burney and Wilson, N.A. Owner to blame for sending ship to sea in an unseaworthy condition. Master acquitted of premature abandonment.

291. *Garonne*, s.s.; iron; built at Govan, near Glasgow, 1871; owned by Mr. J. Anderson, of London; tonnage, 2,468; Adelaide to London; passengers and wool; stranded on Tapley Shoal, Gulf of St Vincent, South Australia, March 19, 1879. Inquiry held at Westminster, May 27, 1879, before Rothery, Wreck Commissioner; Pickard and Jones, N.A. Casualty due to the wrongful acts of the master in steering improper courses, but as no material damage appears to have been done, the Court has no power to deal with his certificate.

292. *Northam;* iron; built as a steamship, 1858; altered into a sailing ship, in 1876; owned by Sir James Malcolm, of Liverpool; tonnage, 1,492; London to Sydney; passengers and general cargo; lost by fire and abandoned at sea, December 21, 1878. Inquiry held at Westminster, May 27, 1879, before Rothery, Wreck Commissioner; Pickard and Jones, N.A. No evidence to show how the fire originated, nor was the master or any of the crew found in default. Certificate returned.

298. *John Black;* wood; built at Nova Scotia, 1858; owned by Thomas Hancock, Sunderland; tonnage, 129; Caen to Sunderland; ballast; stranded near Seaham, May 18, 1879. Inquiry held at South Shields, May 30, 1879, before Steavenson, Judge;

Parfitt and Beasley, N.A. Master in default for neglecting to use the lead, and for not seeing that a proper look-out was kept; but as the vessel sustained no material damage, his certificate was returned.

Official Inquiries Abroad.

271. *Forget-me-Not*, barque; lost at Chefoo, February 28, 1879. Naval Court held at Chefoo, March 13, 1879. Ship not moored properly and no look-out kept. Master censured.

272. *Violet;* sprung a leak at sea, February 13, 1879. Inquiry held at Port Elizabeth, February 28, 1879. Accident due to stress of weather. No blame attached to master.

273. *Mary Frere*, s.s., and *Callian Pussa*, dinghee; in collision, January 12, 1879. Inquiry held at Kurrachee, February 7, 1879. Collision due to careless navigation on the part of the crew of the dinghee.

278. *Barso*, schooner; stranded on rocks near Bird Island, January 30, 1879. Inquiry held at Port Elizabeth, March 20, 1879. Mate guilty of careless navigation, but held no certificate.

281. *Ziba*, three-masted schooner; wrecked on the bar at Durban, March 13, 1879. Inquiry held at Durban. Master being on shore at time of accident, was held not guilty, but was censured for not having left a pilot or other competent person in charge.

282. *Racer*, brigantine; wrecked at Martha Point, January 28, 1879. Inquiry held at Cape Town, April 2, 1879. Master guilty of gross negligence in not using the lead. Certificate suspended for six months.

283. *James Vinicombe*, barque; lost at Sourabaya, February 22, 1879. Inquiry held at Sourabaya, March 22, 1879. Master and crew free from blame.

284. *Lady Bird*, barque; took fire in Rangoon River, March 25, 1879. Inquiry held at Rangoon, April 9, 1879. Master to blame for leaving his ship without some competent person in charge. Certificate suspended for six months.

285. *Taiwan*, s.s.; lost off Bird Island, February 14, 1879.

Inquiry held at Amoy, March 6, 1879. Master censured for not making efforts to ascertain his position, and for inattention to the log.

286. *Benclutha*, barque; lost on Cape Cod. Naval Court held at Chefoo, March 11, 1879. Court expressed satisfaction at the seamanlike conduct displayed by master under most trying circumstances.

287. *Syracuse*, s.s.; lost on Ras Iddar, Cape Bon, May 5, 1879. Inquiry held at Malta, May 9, 1879. Master guilty of error of judgment and was reprimanded.

289. *Ada Barton*, barque; abandoned at sea, April 27, 1879. Naval Court held at New York, May 8, 1879. Casualty due to stress of weather. Master justified in abandoning the ship.

290. *Minero*, barque; stranded in Carrizal. Inquiry held at Carrizal. Master exonerated from blame.

293. *Ambota*, s.s.; wrecked on the Kadda Rocks. Inquiry held at Galle, April 3, 1879. Master guilty of culpable negligence in discharging his pilot, and then deliberately running his vessel on the rocks. Certificate suspended for two years.

294. *Marian Moore*, barque; lost near Ras El Shijr, on the Oman Coast, March 9, 1879. Inquiry held at Muscat, April 4, 1879. Master to blame for careless navigation. Certificate suspended for six months.

295. *John Rennie*, ship; stranded on the Inner Bar, Port Adelaide, April 13, 1879. Inquiry held by Marine Board of South Australia. Casualty due to bad steering. Pilot free from blame.

296. *Eagle Wing*, brigantine; lost at Cape Town, February 22, 1879. Inquiry held at Cape Town, March 31, 1879. Master and mate exonerated from blame.

297. *Tenasserim*, s.s., and *Mussaffa;* in collision at sea, February 12, 1879. Inquiry held at Bombay, April 16, 1879. Considerable blame due to the fourth officer of *Tenasserim*, but he was uncertificated. Court considered that it was most reprehensible to entrust a vessel like the *Tenasserim* to so young and inexperienced an officer.

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REPORT OF THAMES TRAFFIC COMMITTEE.

THE collision between the *Princess Alice* * and the *Bywell Castle*,—for full particulars of which we must refer our readers to the *Nautical Magazine* for the month of October, 1878,—led, amongst other things, to the appointment of a Committee to consider and report whether regulations could not be drawn up which might add security to the conduct of traffic on the overcrowded and over-burdened Thames. The Minute appointing this Committee is as follows :—

"The Lords of the Committee of Privy Council appointed for the consideration of all matters relating to trade, hereby appoint Thomas Henry Farrer, Esq., Secretary to the Board of Trade; Admiral Sir R. Collinson, K.C.B., Deputy Master of the Trinity House; Admiral Sir Frederick W. E. Nicolson, Bart., C.B., one

* [In the Supreme Court of Judicature, the Lords Justices of Appeal have found the *Princess Alice* alone to blame for the collision. This bears out the principle that we have for many years endeavoured to impress on our readers, viz.: That if by a departure from the regulations, the ship A renders a collision probable, she cannot throw the responsibility on the ship B, which in the agonies of collision and as a result of the wrong movement of the other vessel may also commit a wrong manœuvre.—Ed.]

of the Conservators of the River Thames; Staff-Capt. Batt, R.N., Master Attendant at Chatham Dockyard; Thomas Gray, Esq., Assistant-Secretary to the Marine Department, Board of Trade; W. C. Morgan. Esq., Secretary to the Steamship Owners' Association; Digby Murray, Esq., one of the Nautical Advisers to the Board of Trade; to be a Committee to consider the rules now in force, and to report to their Lordships whether any, and if any, what fresh Regulations are necessary, with a view to preventing collisions, and for regulating traffic in the navigation of the River Thames, bearing in mind the special points following: that is to say, the Rule of the Road; the lights to be carried; the use of signals; the speed of steamships; the necessity or otherwise for alteration of the Regulations concerning the number of passengers carried by steamships in such waters; and as to appliances to be provided for saving life in cases of emergency; and the hours during which passengers shall be carried in river steamers; and finally, to report whether, and in what manner, further provision can be made for better securing the safety of human life upon the river; stating with whom the responsibility now rests for making and carrying into effect the Regulations for that object; and whether any alteration appears to be desirable in the distribution of the work amongst the authorities or officers now charged with it."

General remarks on the Report.

To the Committee thus appointed no valid objection can be made. Every member of it is well known in connection with shipping and navigation; and the names of several are "familiar in our mouths as household words" whenever the Rule of the Road or Mercantile Marine legislation has been, or is, discussed.

The minute bears no date, but the Committee commenced its sittings on Monday, the 21st October, 1878, and ended them by signing their Report on the 16th June, 1879.

Before we proceed to review the lengthy, interesting and exhaustive Report of this Committee, and the voluminous evidence on which it is founded, we feel it to be our duty to pay tribute to the masterly way in which it is drawn, and to the methodical and orderly manner in which it and the evidence are arranged and

indexed. A word of praise is specially due to the Clerk of the Committee, Mr. R. C. Heron Maxwell. We do not recollect to have previously observed this gentleman's name in connection with work of this sort. From the manner in which he has presented the general public with this report of 50 pages, having well arranged the evidence, altogether reaching nearly to 600 pages of matter, printed closely in double columns and covering the answers to 10,843 questions, and its appendix made up of matter, legal, nautical, historical and antiquarian, and having added thereto complete analyses in the shape of "subject" and "personal" indexes, we can only express a hope that we may often find his name hereafter in a similar position (clerk) on Committees; and we trust moreover that clerks of other Committees will follow the example set by Mr. Maxwell in this instance, and instead of throwing at the public an undigested mass, will present them with a well ordered and assorted volume. The work of the Committee is all the more commendable since each member has given his time and attention to the laborious and studious work involved without the slightest chance of any remuneration or substantial recognition of any sort. In according praise to those concerned in contributing to the safe navigation of the river, we must not omit to mention the names of Mr. Balguy, the magistrate, and the Assessors, Captains Forster and Parfitt, and Mr. Ravenhill. Their original report on the *Princess Alice* and *Bywell Castle* collision is conspicuous for its thoroughness and absence of irrelevant matter.

"He asked for bread and they have given him a stone," was our remark on receiving a copy of the ponderous blue book which the Committee have presented to Lord Sandon as an answer to and by way of fulfilment of his minute. The stone thus presented, like that covered by the luscious pulp of the peach or nectarine, is hard to crack, contains more kernels than one, and when extracted, those kernels are indeed of exceeding bitterness and hard of digestion; perhaps, to use a phrase better known to English readers "in the mouth it is as sweet as honey, but in the belly it is bitter as gall." On first comparing the Report with the short and crisp minute of reference to the Committee, it is not easy to discover how the question of Compulsory Pilotage, or the

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constitution of the Watermen's Company have managed to find their way into it, and have occupied the major part. The general public thought that some rule was possibly necessary to prevent "those steamers" tearing away down the river and taking charge of just so much of the waterway as might gratify the sweet will of the master, or enable the pilot to make haste over his job, so that he might be ready for another; and that some measure might also be desirable to prevent the "free" watermen in charge of dumb barges, from placing their craft athwart the tide, so as to block the navigation, while they, "resting from their toils," might indulge in the solace of strong tobacco in a short pipe, and the pleasure of "stating" adjectives of an uncomplimentary character. The public, like ourselves, were unprepared to find that the way to ensure the maximum of safety to life and property on the river, and the orderly conduct of navigation is not by establishing on the one hand a clear, uniform, and complete rule of the road, nor, on the other, by leaving the method of and responsibility for keeping out of collision, to the judgment and on the shoulders of the master or pilot; but is to a very great extent, if not mainly, to be found in the abolition of the free licensed watermen and lightermen all over the river; the extinguishing of compulsory pilotage between Gravesend and London Bridge, and the institution of two or more varying sets of rules for navigation. Yet such are the conclusions arrived at by this exceedingly competent Committee, after eight months passed in the examination of witnesses and in deliberation, and to our mind the Committee are without question entirely in the right.

We reserve for an article by itself the discussion of the proposals concerning the Rule of the Road, and the measures thereon recommended by the Committee for the conduct of persons in charge of vessels and craft on the river, for the present contenting ourselves by placing before our readers the main features of the other parts of the report.

On referring to the minute of Lord Sandon appointing the Committee, our readers will observe that the last sentences desire the Committee to "state with whom the responsibility now rests for making and carrying into effect the regulations for that object (*i.e.*, the better securing the safety of human life on the river), and

whether any alteration appears to be desirable in the distribution of the work amongst the authorities or officers now charged with it." Under this reference we presume the Committee have been able to see their way to render to the shipping community the lasting boon of recommending the disestablishment of the "free" waterman altogether, and of the compulsory pilots above Gravesend, two institutions which have, down to this time, stood as barriers against freedom of contract, and the conduct of orderly and safe navigation on the River Thames.

Absence of control of, and order on, the Thames.

A division of authority is bad. "Too many cooks spoil the broth" is a true saying, which has, however, against it a more high-sounding and often a more misused one, that "in the multitude of counsellors there is safety." If the case of the Thames navigation be regarded as coming within the former proverb there is no room for wonder that confusion has become worse confounded, for we learn from the Report that no less than five distinct authorities, bodies, or embodiments hold sway; and that the duties or control of these bodies, or some of them, over-lap and mix in a disagreeably confusing manner.

The bodies who, *en bloc*, conjointly, or somewhat disjointly, make up the controllers of the river, are—

1. The Conservators of the Thames.

2. The Master, Wardens and Assistants of the Trinity House Corporation.

3. The Master, Wardens and Assistants of the Watermen's Company.

4. The Commissioners and Assistant Commissioners of the Metropolitan Police.

5. The Lords of the Committee of Privy Council appointed for the consideration of matters relating to trade and foreign plantations, *i.e.*, the Board of Trade.

We should, however, at once explain that it is but nominally and in theory only, and by nothing but courtesy, that the above important bodies can be said to be the rulers of the river, for as a matter of fact, and apart from theory, the rulers of the river

are the watermen and lightermen, whose " freedom " has developed into " license," and the pilots. If the theory that " in the multitude of counsellors there is safety " be applied to this case, then it is not easy to understand how the navigation of a river like the Thames, which having endured for so long the inestimable privileges resulting from the care of five bodies of such antiquity, lustre, and importance as are those named, watching over it, lighting it, dredging it, licensing its pilots, and watermen, and lightermen, regulating its traffic, and so forth, can be in anything but a state approaching to perfection of the highest attainable degree. On this view the only conclusion to be drawn would be that its rules are perfect, its police efficient, its order unquestionable, its traditions good, while if haply there be found one person having the hardihood to offend, or to neglect to inform himself and act on the rules, to disregard the observances, or to remain in ignorance of them, he would be arrested and punished.

Captain James, the senior harbour master, inclines to this view, as will be found on reference to his evidence. We quote a few questions and answers bearing upon it :—

" 10,258. You tell us that you do not think any improvement is wanted ?—I do not see that it is, except in the matter of the signals, to tell another ship which way you are going.

" 10,259. You think in all other respects the navigation of the Thames is so satisfactory, the conduct of the people on the Thames is so satisfactory, and the observance of the law so complete, and everything so well ordered, that nothing farther is necessary ?—I cannot see it myself."

" 10,265. With regard to the sailing barges, they are extremely well navigated, are they not ?—Yes, very well.

" 10,266. And the men are very civil ?—Yes.

" 10,267. You think that there is no improvement wanted there ?—No.

" 10,268. Do you find that the licensed watermen are the same ?—Yes."

" 10,272. We understand that you personally do not want any further power to improve the order and control of things on the Thames ?—No."

"10,376. You think we have just arrived at the happy point when we cannot do better than we are doing now?—I do not see how you can better it. I do not see how you can tow all the barges that frequent the Port of London, 10,000 we will say in the Port of London itself, besides 5,000 outside barges."

"10,378. You think we have just arrived at the happy point when we could not do well without the barge power which we have got and when we do not need to increase it?—I do not think we can increase it with safety."

To the imagination of the gallant captain, it would seem that the silver Thames is a happy and tranquil stream, "on whose pellucid surface" moves the gentle "Bargee," a being of grace and manners, half Adonis, half Hercules, and wholly Evangelical, whose "words distil as honey from his lips," whose happiness is administered to and heightened by "ethereal odours wafted on the breeze" from the fragrant banks, and whose senses are lulled into refinement by the soothing music of the seductive steam-whistle. "A curl or film of aromateous cloud" is visible around his head, as he, lending his strength and grace, wields the massive oar, by which, his symmetrical bark "keeps endward to the ever running tide: shuns contact with frail craft upon the stream; nor knuckles steamers to their detriment." The words in this paragraph placed in inverted commas are not the words of the harbour master, but are quotations gleaned from other sources which appeared to us to be applicable in stating the case in a broader and more pleasing manner.

We fear, however, that other evidence does not present matters in such roseate hues. For instance, Captain James himself was constrained to bear witness against absolute perfection, when he gave the following evidence:—

"10,309. Will you tell us what steps are taken to carry into effect such a bye-law as this: Bye-law 36—'The master of every steam-vessel navigating the river shall be and remain on one of the paddle-boxes or on the bridge of such steam-vessel, and shall cause a proper look-out to be kept from the said steam-vessel during the whole of the time it is under way, and shall remove or cause to be removed, any person other than the crew who shall be

on the bridge or paddle-boxes of such steamer.' What steps do you take to remove people off the bridges of steamers?—I take no trouble about it.

"10,310. Do any of your officers?—No.

"10,311. Is that bye-law carried into effect?—Yes.

"10,312. Who by?—By the master of the steam-vessel; if not there is a penalty for it.

"10,313. Do you see to the carrying into effect of that bye-law?—No I never see to the carrying of it into effect.

"10,314. Nor any one under your orders?—No.

"10,315. With regard to bye-law 38—'Every steam-vessel navigating the river and conveying passengers from any landing-place to any other landing place thereon, shall have painted and conspicuously displayed on the outside of such vessel, and on each side thereof, in letters of not less than 3 inches in length, the names of the places between which such vessel plies.' Who carries that bye-law into effect?—That is not done at all.

"10,316. By what authority is it not done?—I do not know."

Again, a pilot who was selected and "sent by the gentlemen of the Coal Exchange as able to give evidence on behalf of screw colliers" was examined, and answered as follows:—

"2,809. I think that you act as pilot of a great number of screw colliers?—I do. I hold a license as an exempt pilot between London and Gravesend.

"2,810. And your employment, I believe, is entirely in screw colliers?—I have been for 46 years on the water. I have been master of a collier for a short time, and I have been with ships to the North occasionally; but I have occupied my time for 42 years in the Thames solely in sailing ships and steamships."

"2,904. But if the rule is that you shall port, why is the extra light required to show that you are going to do what the rule says you shall do?—The mischief seems to me to be that when we meet one another we do not know what each of us is going to do. There always seems to be a misunderstanding between two ships approaching each other.

"2,905. Do you mean that there is a doubt whether you will act on a rule or not?—That is it.

"2,906. But if you do act upon the rule you do not want a signal to say that you will act upon the rule?—We have never known that there has been a rule upon the Thames until lately.

"2,907. How long have you known it?—Only a month.

"2,908. You never knew until last month that there was a Rule of the Road on the Thames?—No, and I do not think that others knew it.

"2,909. Do you not think it better that everybody should know the rule, and should act upon it, instead of having additional lights to indicate to another ship what you propose to do?—I think so. If the Thames Conservancy frame rules, and do not make them known to pilots and others, how are we to know that they frame them?"

Again, the Chairman of the Watermen's Company gives evidence:—

"3,598. The next bye-law provides for a penalty on people who get on the deck cabins of steamboats; it is a penalty of 40s.; and there is a penalty if a proper look-out is not kept from the bow of the steamboat or vessel. Did you ever know of a case in which a penalty for not keeping a look-out was enforced upon the Thames under this bye-law?—I have never known such a case to come before our court.

"3,599. In the Boat Race week up the river, and at the other crowded times, have you ever had anybody up before you for sitting on the deck cabin of a steamer?—No; no such case has come before the court to my knowledge.

"3,600. Then you have a bye-law forbidding passengers going on board when a ship is in motion, is that ever enforced?—Very seldom, I do not know that I can refer you to a case.

"3,601. Then you have a special bye-law, namely, bye-law 101, against navigating at a furious or dangerous rate of speed, or in a wilful, careless, or negligent manner, and the penalty there is £5, is that ever enforced?—It has never come before our court.

"3,602. Then under bye-law 102 there is a penalty for steamers not starting within 15 minutes of their advertised time, has that ever come before your court?—It has not."

And as dispelling still furthur the roseate hue of the Chief

Harbour Master, the Committee give an ugly string of evidence, of which we take the few following sentences at random, as to the privileged, that is to say, the "free" waterman. "He sits with his oar overboard or inboard, and when you sing out to him he laughs at you." "They are uncivilized men." "They will not take care of their master's property." "They are turbulent." "Nearly every master lighterman says, 'I would discharge the man if you like, but I must take on another just as bad.'" "They are a bad lot altogether." "The conduct of some is so bad that it is enough to taint the character of the whole of the watermen as a community." "The state of things could not be worse than it is."

No rules however good, and no reforms however thorough in intention, can be useful or successful so long as the river traffic remains at the mercy of what we fear we are justified on the evidence of this report in calling a lawless, if not a semi-barbarous set of men. (Our readers will observe that we are not using this language as justified by our own knowledge and experience, but solely on the statements made public by Lord Sandon's Committee.) It is only a logical conclusion, therefore, that previous to the application of any remedy must come the disestablishment of the waterman whose "freedom" has run to "license," and the substitution in the place of the present "Covenanted Service" of a system whereby a "competent" rather than a "licensed" man may be employed in the open market and under freedom of contract.

That in the chief river and port of the chief mercantile community of the world, and at the present day, a monopoly of so mischievous and vicious a character as that fostered by the Watermen's Acts can exist, and that an anachronism such as that covered by the system of compulsory pilotage can obtain, speak volumes for the patience and long suffering of that much enduring man, the British shipowner.

The Watermen's Company.

The Watermen's Company is an old guild, dating from the fourteenth century, who for many generations had the monopoly of the navigation of the Thames under various Acts and ordinances

of the Crown, and by the most recent Acts no person but a freeman of the Company or an apprentice is allowed to act as a waterman or lighterman, or to ply, work, or navigate any wherry, passenger boat, lighter, vessel, or other craft upon the river from or to any place or vessel between Teddington Lock and Lower Hope, near Gravesend.

"In order to obtain a lighterman's license, a freeman must have served a five years apprenticeship, be 19 years of age, and have been for two years immediately preceding his application continuously engaged in working a barge or lighter within the limits of the Act.

"In order to obtain a waterman's license, a freeman must have served a five years apprenticeship, be 19 years of age, and have been for two years preceding his application continuously engaged in working a boat or craft within the limits of the Act."

It is not necessary that we should follow the report of the Committee through the history it gives of the Watermen's Company, but we may mention that the licensed watermen and lightermen of the river were originally the class who were specially liable to be called on to serve in His Majesty's ships, and that they were pretty freely used and wasted for this purpose. In return for their liability to compulsory service in Kings' ships, they obtained many special and peculiar privileges. The men are now no longer specially liable to sea service, but they still retain many of their special privileges. If no other reason existed for abrogating their privileges, the reason that the conditions upon which those privileges were granted in compensation have ceased to exist would be sufficient. In old times the watermen had almost a monopoly of the carrying of passengers, and it is curious to refer back and to find that they hindered the removing of theatres from the banks of the river, on the grounds that their occupation, in conveying the audience to and from by water, would be prejudicially interfered with, and that such interference was against the interests of the State. And that similarly they opposed for a time, with very great success, the introduction of private carriages, and for a longer time still the introduction of public conveyances by road. At the present time the energies of

the watermen seem to be directed not to the improvement of the men as a class, and the keeping of them in check; but to the fining of persons who fail to employ duly licensed men. The substance of the recommendation of the Committee is as follows:—

"It proves beyond any reasonable doubt that the monopoly of the Watermen's Company has produced the evils usually due to monopoly, and that it should be put an end to.

"The question will then arise whether employment on the river should be thrown open altogether, leaving the selection of proper persons to the owners of the craft, or whether any attempt should be made to establish a system of tests and licenses to be granted to ali persons who prove themselves competent, and to them only?

"As regards river passenger steamers we can have no doubt that the owners should be left as free to select their crews as owners of other passenger steamers. It is impossible to hold the owners, either of passenger steamers or of other craft, justly responsible for the manning and conduct of their vessels if they are restricted in their choice to a class of men who are limited in number and whose antecedents and statutory qualifications afford no security for competency or behaviour. But we think that the master of any river passenger steamer plying below Gravesend should possess a certificate, to be granted, as in the case of seagoing passenger steamers, by the Board of Trade.

"As regards the best mode of dealing with the men employed in barges, we have had more hesitation, not so much on the merits of the case, as because some of the employers of these barges who desire the repeal of the existing monopoly, and whose views deserve the fullest consideration, have told us that in their opinion all who seek to be employed as lightermen on the Thames should be licensed after proving their qualification by examination. But considering the great difficulty of establishing a satisfactory examination; considering also that the western barges and the sailing barges requiring at least equal skill, are admirably navigated by men who are simply selected for the purpose by their owners, and are not required to pass any examination; considering also that the best way of securing good and skilful service is in general to throw

the responsibility on the employer, and to leave him perfectly free to select whom he pleases, we are not disposed to recommend any test examination or preliminary proof of qualification."

"We recommend, therefore, that the navigation of barges on the river be thrown open entirely, leaving the men employed in it subject to penalties in case of misconduct or breach of bye-laws, and the owners liable also to civil damages in cases of injury. If this be done, the men will be relieved from original payments amounting to £3 16s. 6d., and an annual payment of 3s. now made to the company.

"The court of the company possesses, as above mentioned, jurisdiction to enforce their own Act and bye-laws against the members of the company at the suit of members of the company. Strictly speaking, they have no jurisdiction to entertain a complaint at the suit of any other person (except of an inspector of the Conservators under section 17 of the Conservators Act, 1870), nor have they jurisdiction to entertain a suit against anyone who is not a member of or licensed by the company. Nor is the jurisdiction of the ordinary magistrates excluded by any of the above Acts. But we are informed by the superintendent of one of the police districts, who has charge of the river, that the only remedy in practice for misconduct by a waterman is before the court of the company, and that this remedy is inadequate. This is confirmed by the evidence of the chairman of the company, who says that complaints by the public are entertained by the court of the company, and that the Lord Mayor refers such complaints to the court of the company.

"In the Appendix will be found a list of the complaints brought before the court of the company. They consist chiefly of charges against watermen for carrying too many passengers, or for abuse, and against barge owners and their servants for want of name or number on barges, and for employing unlicensed men.

"So far as regards the employment of unlicensed men, these charges will, if our recommendations are adopted, be at an end; and so far as regards the other cases they seem to us to be proper cases for the ordinary police courts, where justice is administered according to well-known rules and under proper safeguards. We

think, therefore, that the judicial functions of the court of the Watermen's Company may with advantage be abolished, and that the jurisdiction over all offences on the river should be restricted to the ordinary courts."

"If these changes are made, it will probably be necessary to transfer the registration of barges to the Conservators. It is important that this registration should be continued, since without it, and without some name, number, or other distinguishing mark painted on the barges, it would be impossible to identify them and to enforce the regulations against them.

"These barges, though occupying the water space of the river and using the public moorings, now pay nothing towards the Conservancy fund. They pay to the Watermen's Company as follows:—

"On first registration, if owned by a freeman, 10s.; if owned by a non-freeman, £1; and annually, if owned by a freeman, 2s. 6d.; if owned by a non-freeman, 5s. If our recommendations are adopted these fees will be abolished; and we suggest that for each barge whilst it remains on the register, the owners should pay annually 10s. to the Conservators."

Compulsory Pilotage: its partial abolition.

As regards compulsory pilotage the Committee have presented Lord Sandon with an exhaustive essay, which proves beyond question that compulsory pilotage, or rather the state of no responsibility brought about by it, not only on the Thames, but everywhere is an evil.

"Two ships, A and B, both of the same size and description, come into London, A from the North Sea, B from the Channel. Both employ a pilot. They get into collision. If A is in fault, B has a remedy; if B is in fault, A has none.

"Two ships, A and B, say from Leith to London, both take a pilot at Orfordness. A has passengers; B has none. They get into collision. If A is in fault, B has no remedy against A; if B is in fault, A has a remedy against B.

"Two ships again, A and B, bound from Havre to London, take pilots at Dungeness. The master of A has taken pains to pass a pilotage examination, and he has a pilotage certificate.

The master of B has, perhaps purposely, avoided doing so. They come into collision. A has no remedy against B, whilst B has a remedy against A.

"The object of the legislation of 1854 concerning passenger ships, viz., that of requiring, through the medium of compulsory pilotage, that masters shall learn to pilot their own ships, is thus defeated. Your Committee are informed that there has actually been a case in which the master of a Scotch passenger steamer asked the Board of Trade to contract the limits of a certificate which they had granted him, because his ability to pilot his own vessel exposed his owner to liability when in a charge of a pilot.

* * * * *

"A further consequence of this exemption from responsibility, coupled with the doctrines laid down by the Courts concerning the relation between the master and the pilot, is to remove the responsibility from the master of the ship, and to prevent him from attempting to interfere with the management of the pilot, however bad that management might be. The following is an extract from the Judgment of the Privy Council, in the case of 'Hammond *v.* Rogers,' in the case of the *Christiana;* Moore's Rep., p. 171. Baron Parke says:—'The duties of the master and the pilot are in many cases clearly defined. Under ordinary circumstances we think that the pilot's commands are to be implicitly obeyed. To him belongs the whole conduct of the navigation of the ship, to the safety of which it is important that the chief direction should be vested in one only. It was never intended that, under ordinary circumstances, the master was to exercise any discretion whether he could obey the pilot or not. There may be extraordinary occasions when the master would be justified in disobeying the commands of the pilot. If from sudden illness, or intoxication he becomes incompetent to command, the supreme authority would revert to the master during the pilot's temporary incapacity. It may be the same in the case of manifest incapacity of a permanent character; but any opinion upon these questions is unnecessary for the decision of the present case, as none of these circumstances occurred. The pilot has unquestionably the sole direction of the vessel in those respects whereon his

local knowledge is presumably required.' The same doctrine has been laid down by Dr. Lushington, and was relied on by the Court of Inquiry in the recent case of the *Spindrift*, as a reason for exempting the master from blame. The obvious tendency of such a state of the law is to induce the captain to abstain from all interference with the pilot, however necessary. If, in order to prevent obvious danger, he interferes, according to the above doctrines he makes his owner liable for the consequences. If he goes below, or stands by, and sees the pilot run his ship into danger, he knows that the law will free him and his owner from all blame or liability."

The Committee point out that—

"These objections are admitted by most of the advocates of compulsory pilotage, and apparently by the Trinity House, for, whilst stating the arguments in favour of compulsory pilotage, they at the same time express an opinion that in accordance with what they understand to be the law in America and several Continental States, the immunity from liability of the owner should be abolished, and also that the pilot should be placed by law in the position indicated by the Admiralty regulations quoted above.

"Your Committee think, however, that it would be difficult, if not impracticable, to carry this opinion into effect without abolishing compulsory pilotage. In the words of the Committee of 1870—

"'It is obvious that any attempt to carry this proposal into effect would be met by very serious opposition from the great body of shipowners. The legal principle on which the present law is founded, viz., that a man is liable for the acts of those whom he voluntarily employs, but not for the acts of those whom he is compelled to employ, appears to your Committee to be in itself just and reasonable. And if, for the sake of remedying a practical inconvenience, this principle is departed from, it is probable that further anomalies and inconveniences will be the result. Nor is it likely that the captain and the pilot will ever assume their proper relative positions so long as the former is compelled to employ the latter.'

"Under these circumstances your Committee have no hesita-

tion in recommending the abolition of compulsory pilotage above Gravesend. They are confirmed in this resolution by the following statement of the Elder Brethren :—

"'As to No. 10, "*That compulsory pilotage and the immunity arising therefrom should be abolished above Gravesend,*" it will be gathered from the answers to the previous question that the Elder Brethren do not regard immunity as the corollary of compulsion, but as respects compulsion in the river, although the Trinity House cannot but have some anxiety whether without it the desirable safeguards can be properly provided, yet seeing that by legislation more or less contrarious, a state of great confusion exists, and that without compulsion owners as a rule do take pilots, the Elder Brethren have come to a resolution that as respects the river above Gravesend they would not oppose its abolition; trusting that, if abolished, the Legislature would, in the interests alike of life and property, and the prudent owner, entail on those who neglected to avail themselves of properly qualified servants penal and pecuniary consequences, at least as great as those for any variety of recklessness in land transit.'

"We are aware that, if compulsory pilotage is abolished, no ship, whether carrying passengers or not, will be required to take a pilot above Gravesend; and that the provision made in 1854, by which home-trade passenger ships are required either to take pilots or to be navigated by officers who have passed a pilotage examination, will be virtually repealed. But the practice of home-trade passenger ships and of exempted ships shows that ships do as a matter of fact generally employ pilots above Gravesend, whether required to do so or not. As regards the provision requiring home-trade ships to take a pilot if they do not pass a pilotage examination, it is to be remembered that the principal object of that provision was to induce the officers to qualify themselves in pilotage. As a matter of fact very few masters of foreign-going ships do so qualify themselves; and one reason of this is that when they are so qualified, pilotage ceases to be compulsory, and their ship ceases to enjoy the immunities from liability for damage which a ship in charge of a compulsory pilot enjoys. The abolition of the obligation to employ a pilot will do

away with this reason, and will *pro tanto* encourage that pilotage qualification in masters and mates which the enactment of 1854, whilst intending to promote it, has really discouraged."

The number of pilots to be unlimited.

As regards the numbers of Thames pilots, for the future the Committee say—

"There is a question whether the number of licensed pilots should be limited, as at present, by authority, or whether all men who can show sufficient experience, pass their requisite examination, and produce evidence of good character, should be allowed to obtain a license. On the one hand, the Trinity House 'think that it would be better to license only up to the full necessities of the port;' meaning, probably, that the licensing authority should be the judge of what those necessities are. On the other hand, there is evidence that, under the present system of limitation, men whom the shipowners believe to be competent, are prevented from getting a license, whilst men who are not competent have succeeded in getting upon the limited list. There are consequently complaints that, whilst there is no scarcity of good unlicensed men, the shipowner is sometimes obliged to put up with inferior and incompetent licensed men. Your Committee think that the mode of selection which they have recommended affords a solution of this difficulty. They agree with the Trinity House that it might be undesirable to admit to the roster any number of watermen who might apply for licenses upon the speculation of earning money as pilots; and on the other hand they think that shipowners who are ready to employ really qualified men, should not be deprived of their services simply because there is not room for such men on the ordinary list of pilots. Your Committee propose, therefore, that if shipowners recommend a man for a license, with a view to employ him, he should be examined and, if found competent, licensed for such employment, whether there is room for him on the regular list or not. We are aware of the difficulty which may arise from having two sets of pilots, the one set on the regular list, the other licensed for particular owners. But we think the pilotage authority may meet this difficulty, either

by extending the regular list, or by putting the specially licensed men on the regular list as soon as there is room for them."

Thames Conservancy Board.

Whilst the Committee have proposed to disestablish the Watermen's Company and compulsory pilotage above Gravesend, they propose to strengthen the hands of and add much new work to the Thames Conservancy Board.

Dumb barges.

As regards dumb barges, the recommendation of the Committee is :—

"Looking to the number and extent of the interests on the Thames which are concerned in the barge traffic, we are not prepared to recommend the immediate adoption of a rule as stringent as that which is in force on the Tyne. But we think that, in accordance with the principle of that rule, a rule should be made for the Thames requiring barges to be navigated in such a manner as to impede the navigation as little as possible; and that for the breach of this rule the barge, as well as the men in charge, should be responsible, the barge owner being, as more fully mentioned below, left free as to the men or the power he chooses to employ.

"The rule we recommend as suitable for the present circumstances of the river is that, 'dumb barges, *i.e.*, barges managed by oars, shall not be allowed to drift athwart the channel, but shall be so navigated as to be kept end on with it, except in cases where an exceptional force of wind makes it impracticable so to navigate them.'

"As regards towing, we think that a rule may properly be made requiring all dumb barges navigating the whole distance between London Bridge and the uppermost of the dock entrances in Blackwall Reach to be towed. In thus limiting the area within which towing is for the first time to be made compulsory, we contemplate a possibility, if the experiment is found to succeed, that the obligation may at some future time be extended."

Lights to be carried.

As regards lights, the only alterations the Committee recommend are :—

"On the whole we are of opinion that dumb barges should be compelled to have a white light ready for exhibition, but should only exhibit the same when it is necessary for them to do so in order to indicate their position to an approaching vessel. In this way the increased multitude of lights will be avoided. We think further that this rule should not be made to apply on that part of the river which lies between London Bridge and the upper entrance to the Victoria Docks, since vessels navigating this part of the river may always expect to meet with dumb barges, and since we propose, as mentioned below, that on this part of the river the speed of steamers shall be reduced.

"As to bye-law 3, requiring the last of a string of barges towed to show a light, there is evidence to show that it has hitherto been very imperfectly obeyed. Your Committee are of opinion that this should no longer be the case, and that the officers discharging the duties of harbour police should have instructions to enforce the bye-law."

"In the new draft of regulations for preventing collisions at sea, which have been recently proposed by a committee appointed by the Admiralty, the Board of Trade, and the Trinity House, and which, as we are informed, will in all probability shortly become the law of the sea, is contained the following rule :—'(*Art.* 11.) *A ship which is being overtaken by another shall show from her stern to such last-mentioned ship a white light or a flare-up light.*'

"The principle of this rule appears to be applicable to vessels navigating the Thames no less than to vessels navigating the sea, and it is approved by most of the witnesses. We therefore recommend that it should be adopted on the Thames. Since however vessels in a narrow and crowded channel are constantly overtaking one another, there might be confusion from the multitude of lights if every overtaken vessel were to show one, and especially if every overtaken vessel were to exhibit a fixed light. Consequently in recommending the rule for adoption, we suggest that it should be modified by words which will show that the light is to be waved and not fixed, and that it is to be shown only when it is necessary in order to indicate the position of the overtaken vessel."

Signals to denote course.

As regards signals to denote the course of ships, the Committee adopt the whistle and reject all lights connected with helm movements. The proposals of the Committee are as follows:—

"When two steam-vessels are approaching one another with risk of collision, the following steam-signals shall be intimations of the courses they intend to take, viz.:—

"One short blast of the steam-whistle of about three seconds duration to mean, 'I am directing my course to starboard, and intend to pass you port side to port side,' and the use of this signal shall be optional.

"Two short blasts of the steam-whistle, each of about three seconds duration, to mean, 'I am directing my course to port, and intend to pass you starboard side to starboard side,' and the use of this signal shall be compulsory.

"This latter signal is to be no justification for disobeying the rule for meeting steamers, and is only intended for cases where a departure from that rule is necessary to avoid immediate danger: and in such case the use of this signal shall be compulsory.

"When it is unsafe or impracticable for a steam-vessel to keep out of the way of a sailing-vessel, she shall signify the same to the sailing-vessel by four or more blasts of the steam-whistle in rapid succession, the blasts to be of about two seconds duration.

"The signals by whistle mentioned in the preceding rules shall not be used on any occasion or for any purpose except those mentioned in the rules; and no other signal by whistle shall be made on any vessel unless it be by a prolonged blast of not less than 10 seconds duration."

Speed of steamships.

As regards speed the Committee recommend:—

"First, That between Tripcock Point or Margaretness and London Bridge, no steamer, other than river passenger steamers certified to carry passengers in smooth water only, shall go at a speed of more than 7 statute miles over the ground. It seems scarcely necessary to observe that, considering the great difference in speed of different steamers, no rule founded on half-speed would

be of any value. The speed of 7 statute miles an hour over the ground would allow of sufficient steerage-way for all steamers going with the tide, whilst the exception of small passenger steamers would enable the river boats, which cause little swell, and to which speed is essential, to carry on their useful traffic without hindrance.

"Secondly, Your Committee recommend that the bye-law of the Conservators above quoted, which now applies only to steamers above Teddington, shall be made applicable over the river from Yantlet Creek upwards to Teddington, and also that it shall be extended to the moorings of vessels as well as to the vessels themselves. Care must be taken that it shall not be limited in its operation by the rule which fixes a maximum speed in certain parts of the river. It appears to your Committee that it ought to rest with every steamer to see that her speed is not such as to cause danger to other vessels or property.

"If these rules are adopted, and if, in accordance with the general suggestions made below, transgressions of the rules as to speed by any vessel not only render the owner or master liable to any penalty attached to the transgression, but also make the owner civilly liable for damage done thereby, your Committee are of opinion that all will have been done which can be done by legislation to check excessive speed."

Reduction in number of passengers recommended.

As regards the number of passengers to be carried, the Committee—

"Recommend that the number of passengers for the river steamers within smooth water limits should be diminished by giving to each passenger four instead of three superficial feet on deck. If the number at present allowed is not dangerous, it is certainly extremely inconvenient and uncomfortable; and your Committee cannot doubt that any decrease of profit which may arise from this diminution will be amply counterbalanced by the increased convenience and comfort afforded to the public.

"We also think that the special attention of the Board of Trade should be called to the numbers allowed in the saloon excursion

steamers. The cabin, the saloon, and the deck above the saloon may all be occupied by passengers; and care and caution are required in order to see that in each vessel not more passengers are carried than her structure allows her to carry with safety.

"Your Committee further recommend that there should be more strict and regular supervision to prevent overcrowding than now exists, and that for this purpose the Metropolitan Police should attend whenever and wherever it may be necessary, whether on the application of the Thames Conservators or otherwise, and that they should count the passengers, and take steps to enforce the law if infringed.

"Your Committee also recommend that the piers at which the steamers call, and the approaches thereto, should be brought within the regular beat of the police, and should be regularly patrolled by them.

"Your Committee are informed, on the part of the Commissioners of Police, that there will be no difficulty in carrying out these recommendations."

Moonlight trips.

As regards moonlight trips, the Committee say:—

"But as regards the saloon excursion steamers, the steamers which carry crowds in the summer to Ramsgate, Margate, and Harwich, and the Gravesend steamers, in short, as regards all passenger steamers plying on the river to or from Gravesend, or places beyond Gravesend, with river or excursion certificates, we think that they should be compelled to end their journeys within a given time after sunset."

Life-saving gear.

As regards the means for saving life in case of emergency, the Committee say:—

"The most practical suggestion which has been made to us is that the seats or other necessary furniture on deck should themselves be made moveable, so that they will detach themselves if the ship sinks, and buoyant so that they will float. The London

Steamboat Company propose to give these inventions a trial, and experience will determine how far their use can be made general.

"Your Committee also regard with satisfaction the statement of the company, that they are considering how far the river steamers can be made buoyant, so that in case of wreck or collision the different parts will still continue to float.

"Under these circumstances, they are not able to make any specific suggestion for legislation, but they think that the attention of the Board of Trade and their surveyors should continue to be directed to this subject."

We have no room this month to continue our remarks on this very able and exhaustive report, but we now conclude by publishing, *in extenso*, the sum and substance of the labours of the Committee in their new proposed bye-laws for the safe navigation of the Thames :—

"REGULATIONS TO BE OBSERVED BY VESSELS NAVIGATING THE RIVER THAMES, AS RECOMMENDED IN THE ABOVE REPORT.

PRELIMINARY.

"1. *Proviso to save special cases.*—In obeying and construing these rules, due regard shall be had to all dangers of navigation; and to any special circumstances which may render a departure from the rules necessary in order to avoid immediate danger.

"2. *No vessel, under any circumstances, to neglect proper precautions.*—Nothing in these rules shall exonerate any vessel, or the owner, or master, or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper look-out, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

"RULES CONCERNING LIGHTS.

"3. *Lights.*—The lights mentioned in the following Articles, numbered 4 to 12 and no others, shall be carried in all weathers, from sunset to sunrise.

"4. A steam-vessel when under way shall carry:

"(*a*.) *Lights for steam-vessels.*—On, or in front of the foremast at a height above the hull of not less than 20 feet, and if the breadth of the vessel exceeds 20 feet, then at a height above the hull not less than such breadth, a bright white light, so constructed as to show an uniform and unbroken light over an arc of the horizon of 20 points of the compass; so fixed as to throw the the light 10 points on each side of the vessel, viz., from right ahead to 2 points abaft the beam on either side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

"Above London Bridge the white light may be carried at any convenient height above the stem.

"(*b*.) On the starboard side, a green light so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least one mile.

"(*c*.) On the port side, a red light, so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to two points abaft the beam on the port side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least one mile:

"(*d*.) The said green and red side lights shall be fitted in such a manner as to prevent these lights from being seen across the bow.

"(*e*.) *Lights for vessels under steam towing other ships.*—A steam-vessel, when towing another vessel shall, in addition to her side lights, carry two bright white lights in a vertical line one over the other, not less than three feet apart, so as to distinguish her from other steam-vessels. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light which other steam-vessels are required to carry.

"(*f*.) A steam-vessel towing may also carry a light showing

astern as a guiding light to her tow, but this light must be so screened as not to be visible further forward than four points abaft her beam.

"5. *Lights for sailing-vessels.*—A sailing-vessel under way, or being towed, shall carry the same lights as are provided by Rule 4 for a steam-vessel under way, with the exception of the white light, which she shall never carry.

"6. *Lights for vessels at anchor.*—A vessel, whether a steam-vessel, a sailing-vessel, or a barge, when at anchor in the fairway of the river, shall carry, where it can best be seen, but at a height not exceeding 20 feet above the hull, a white light in a globular lantern of not less than 8 inches in diameter, and so constructed as to show a clear uniform and unbroken light visible all round the horizon, and at a distance of at least one mile.

"7. *And for outermost vessel in tiers.*—Where masted vessels are lying in tiers, the outermost vessels only of each tier shall carry a light similar to that required for vessels anchoring in the fairway.

"8. *Overtaken vessels shall wave a light.*—Upon any vessel which is being overtaken by another vessel under circumstances which render a light necessary to indicate her position a white light shall be waved to the overtaking vessel.

"9. *Dredgers' lights.* — Every steam-dredger moored in the River Thames shall, between sunset and sunrise, exhibit three bright lights from globular lanterns of not less than eight inches in diameter, the said three lights to be placed in a triangular form, and to be of sufficient power to be distinctly visible with a clear atmosphere, on a dark night, at a distance of at least one mile, and to be placed not less than six feet apart on the highest part of the framework athwart ships.

"10. *Lights for dumb-barges.*—Except in that part of the river which lies between London Bridge and the upper entrance of the Victoria Docks, every person in charge of a dumb-barge when under way and not in tow shall, between sunset and sunrise, have a white light always ready, but shall only exhibit the same when necessary, in order to indicate her position to an approaching vessel.

"11. *Lights for barges in tow.*—The sternmost or last of a line

of barges, when being towed, shall exhibit, between sunset and sunrise, a white light from the stern.

"12. *Lights for vessels marking wrecks, &c.*—All vessels when employed to mark the positions of wrecks or other obstructions shall exhibit two bright lights placed horizontally not less than six nor more than twelve feet apart.

"RULES CONCERNING FOG, &c., SIGNALS.

"13. *Vessels overtaken by fog to anchor.*—All vessels, whether steam-vessels or sailing-vessels, shall when overtaken by fog in the river Thames, come to an anchor as soon as it is safe and practicable for them to do so.

"14. *Vessels to be provided with means for sound signals.*—A steam-vessel shall be provided with a steam-whistle or other efficient steam sound signal, so placed that the sound may not be intercepted by any obstruction, and also with an efficient bell. A sailing-vessel shall be provided with an efficient fog-horn to be sounded by a bellows or other mechanical means, and also with an efficient bell.

"15. *Signals to be made in fog.*—In fog, whether by day or night, the signals described in this Article shall be used; that is to say,

"(*a.*) A steam-vessel under way shall make with her steam-whistle, or other steam sound signal, at intervals of not more than two minutes, a prolonged blast.

"(*b.*) A sailing-vessel under way shall make with her fog-horn, at intervals of not more than two minutes, when on the starboard tack one blast, when on the port tack two blasts in succession, and when with the wind abaft the beam three blasts in succession.

"(*c.*) A steam-vessel and a sailing-vessel, when in the fairway of the river, and not under way, shall at intervals of not more than two minutes ring the bell.

"STEAM-WHISTLE SIGNALS.

"16. *For two steam-vessels meeting.*—When two steam-vessels are approaching one another with risk of collision the following steam signals shall be intimations of the course they intend to take:

"One short blast of the steam-whistle of about three seconds duration to mean, 'I am directing my course to starboard, and intend to pass you port side to port side;' and the use of this signal shall be optional.

"Two short blasts of the steam-whistle, each of about three seconds duration, to mean, 'I am directing my course to port, and intend to pass you starboard side to starboard side.'

"This latter signal is to be no justification for disobeying the rule (25) for meeting steamers, and is only intended for cases where a departure from that rule is necessary to avoid immediate danger, and in such cases the use of this signal shall be compulsory.

"17. *For a steam-vessel approaching a sailing-ship.*—When it is unsafe or impracticable for a steam-vessel to keep out of the way of a sailing-vessel, she shall signify the same to the sailing-vessel by four or more blasts of the steam-whistle in rapid succession, the blasts to be of about two seconds duration.

"18. *Regulation of whistling.*—The signals by whistle mentioned in the preceding rules shall not be used on any occasion or for any purpose except those mentioned in the rules; and no other signal by whistle shall be made on any vessel unless it be by a prolonged blast of not less than 10 seconds duration.

"RULES AS TO SPEED.

"19. *Vessels under steam to slacken speed.*—Every steam-vessel, when approaching another vessel, so as to involve risk of collision, shall slacken her speed or stop and reverse, if necessary.

"20. *Speed to be moderate in fog, &c.*—Every vessel whether a sailing-vessel or steam-vessel, shall in a fog, if unable to anchor, go at a moderate speed.

"21. *Speed to be such as not to cause danger in passing. See Bye-laws* 28, 46, *and* 5 *of* 1877.—No steam-vessel shall be navigated at such a speed or in such a manner as in passing to endanger or damage other vessels, or moorings, or the banks of the river. Special caution must be used in passing vessels employed in dredging or in removing sunken vessels or other obstruction. If any steam-vessel in passing causes danger or damage, it

shall rest with her to show that she was navigated with proper caution.

" 22. *Limitation of speed above Margaretness.*—Steam-vessels navigating the River Thames between Margaretness or Tripcock Point and London Bridge, other than river passenger steamers certified to carry passengers in smooth water only, shall never exceed a speed of seven statute miles over the ground whether with or against the tide.

" STEERING AND SAILING RULES.

" 23. *Two sailing-vessels.* — When two sailing-vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other, as follows, viz. :—

" (*a.*) A vessel which is running free shall keep out of the way of a vessel which is close-hauled.

" (*b.*) A vessel which is close-hauled on the port tack shall keep out of the way of a vessel which is close-hauled on the starboard tack.

" (*c.*) When both are running free with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

" (*d.*) When both are running free with the wind on the same side, the vessel which is to windward shall keep out of the way of the vessel which is to leeward.

" (*e.*) A vessel which has the wind aft shall keep out of the way of the other vessel.

" 24. *Sailing-vessel and vessel under steam.*—If two vessels, one of which is a sailing-vessel, and the other a steam-vessel, are proceeding in such directions as to involve risk of collision, the steam-vessel shall, if it is safe and practicable for her to do so, keep out of the way of the sailing-vessel.

" When it is unsafe or impracticable for the steam-vessel to get out of the way of the sailing-vessel, and signifies the same to the sailing-vessel by four or more blasts of the steam-whistle in rapid succession, as mentioned in Rule (17), the sailing-vessel shall keep out of the way.

"25. *Steam-vessels meeting.*—When two steam-vessels proceeding in opposite directions, the one up and the other down the river, are approaching one another so as to involve risk of collision, they shall pass one another port side to port side.

"26. *Steam-vessels rounding points.*—Steam-vessels navigating against the tide shall before rounding the following points, viz., Coalhouse Point, Tilburyness, Broadness, Stoneness, Crayfordness, Cold Harbour Point, Jenningtree Point, Halfway House Point or Crossness, Margaretness or Tripcock Point, Bull Point, Hookness, and Blackwall Point, ease their engines and wait until any other vessels rounding the point with the tide have passed clear, which it shall be the duty of such latter vessels to do.

"27. *Steam-vessels crossing the fairway.*—Steam-vessels crossing from one side towards the other side, shall keep out of the way of steam-vessels navigating up and down.

"28. *Vessels overtaking other vessels.*—Every vessel, whether a sailing-vessel or a steam-vessel, overtaking any other, shall keep out of the way of the overtaken vessel.

"29. Where by the above rules one of two vessels is to keep out of the way, the other shall keep her course.

"30. *Navigation of dumb-barges.*—Dumb-barges, *i.e.*, barges managed by oars, shall not be allowed to drift athwart the channel, but shall be so navigated as to be kept end on with it, except in cases where an exceptional force of wind makes it impracticable so to navigate them.

"31. *Towing of dumb-barges.*—Dumb-barges, when employed on through voyages either up or down the river which extend to or include the whole distance between London Bridge and the uppermost of the dock entrances in Blackwall Reach, shall be towed.

"RULES FOR THE RIVER ABOVE BLACKWALL AND BELOW TEDDINGTON.

"32. *Between Blackwall and Teddington.*—Above a line drawn from Blackwall Point to Bow Creek, and below Teddington Lock, those of the above rules which are numbered 1 to 15 inclusive, 19, 20, 21, 28, 29, 30, and 31 shall apply.

"RULES FOR THE RIVER ABOVE TEDDINGTON.

"Above Teddington Lock the following rules shall apply, viz.:—

"33. *Careful navigation.*—Vessels and boats shall at all times be navigated in a careful and proper manner, as well with regard to their own safety as to that of other vessels and boats.

"34. *Speed of steamers.*—Every steam-vessel shall be navigated at such a speed and in such a manner as not to endanger or damage other vessels, or boats, or moorings, or the banks of the river; and special care shall be taken in navigating her when passing other boats or vessels. If any steam-vessel in passing, causes danger or damage, it shall rest with her to show that she was navigated with proper caution.

"35. *Lights of Steamers.*—Every steam-vessel shall, when under way, after sunset and before sunrise, either carry the lights required for steamers by Rule 4, or exhibit a bright white light on or above the stem.

"36. *Names and registration of steamers.*—Every steam-vessel shall bear her name legibly painted or marked on both bows and on the stern; and such name and the residence of the owner shall be registered with the Conservators.

"(Signed) "THOMAS HENRY FARRER.
"RICHARD COLLINSON.
"F. W. E. NICOLSON.
"ROBT. B. BATT.
"THOMAS GRAY.
"W. C. MORGAN.
"D. MURRAY.

"Craig's Court, 16th June, 1879."

SCURVY IN THE MERCANTILE MARINE: ITS CAUSES AND REMEDIES.

THERE is no doubt that since the passing of the Lime-juice Act, scurvy has very materially diminished both in the Navy and the merchant service, but still in the latter its occurrence is by no means rare at the present time. Having, during the last few years had frequent opportunities of enquiring into the conditions that prevail previous to an outbreak of this disease, we propose in the present article to treat briefly of the causes of scurvy and to suggest certain remedies, which if always carried out would probably cause this maritime scourge to be numbered altogether with the things of the past. There are some diseases which seem absolutely to defy all the appliances of preventive science—scurvy is not one of them, and it is a positive disgrace to the present scientific age that its occurrence should be so frequent as is unfortunately the case.

Scurvy belongs to the group of diseases called dietetic, and is caused essentially by mal-nutrition of the body, and anything that conduces to this mal-nutrition may bring about the conditions favourable for its development. It is the common and apparently the correct opinion, that the main origin of this disease may be looked for in the deficiency of certain salts contained in fresh vegetables, and that this deficiency may be compensated for by the use of lime-juice. What these salts are has never been accurately proved, but it is generally believed that they consist of the salts of potash with the vegetable acids, citric, malic tartaric, and lactic. It is certain that neither potash alone nor the vegetable acids alone will either prevent or cure the disease, whereas a combination of the two is always successful. Recent cases however appear to prove that lime-juice *per se* (at any rate one ounce per diem) cannot always be depended on to prevent scurvy, and we are therefore driven to find out other conditions which act at any rate as predisposing and secondary, and sometimes apparently as actually exciting causes of the attack; these

causes are those which induce mal-nutrition of the body and consist of

1st. Too great monotony in the diet of sailors. Whatever may be the quality of provisions the stomach in time gets disgusted at the repetition of the same thing day after day, and in time becomes incapable of digesting it. Owners of ships do not fully realise the fact that in food as in other things "variety is the very spice of life, that gives it all its flavour." Salt beef one day, salt pork the next, given for months in dreary succession is not very tempting, and not very conducive to healthy nutrition. Strong healthy men will stand this kind of diet for a considerable period, but it is merely a question of time—those whose digestions are impaired and who have little stamina will be the first to succumb. Hence therefore, considering the class of men who now go to sea in sailing ships, the wonder is not that there should be so many cases of scurvy but that there should be so few. Lime-juice has done a vast amount of good, but with proper food should not be absolutely necessary. We will however consider the question of a better dietary scale later on, and will now pass on to

2nd. The physical condition of the men when they ship. It is unfortunately too often the case that when sailors come on shore from long voyages and are only a short time on land, they get into bad company, eat very little, living principally by suction, and, falling victims to the wiles of some "lively Polly" or "strapping Sal," carry away with them lasting mementoes of these two seductive sirens in the shape of some of those disorders which the votaries of Venus are liable to contract—"the Gods are just and of our pleasant vices do make instruments to scourge us." Hence, therefore, they are often in a worse state of health when they join the ship again than when they landed, and are just in that condition to become the subjects of scurvy after a few weeks of ordinary sea diet. It is of course very difficult to find a remedy for this state of things, but there is no doubt that if the Contagious Diseases Acts were extended to all ports, this "unseaworthiness ashore" would be greatly mitigated, and if moreover all seamen were medically examined before signing articles, the benefit derived would be very great not only to the health of the men but also to the pockets of

the shipowner. Surely the expense of a small fee per man paid to the medical examiner would be more than compensated for by the advantages of a sound and healthy crew. The old proverb of a "penny wise and a pound foolish" is here amply exemplified.

3rd. Dirt, filth and uncleanly habits, by interfering with the functions of the skin and so deranging the quality of the blood, will often tend to develope the disease. The old saying that "cleanliness is next to godliness" is not appreciated as it should be by the British tar. Dirt certainly seems to be on the increase in the mercantile service, probably owing to the large number of foreigners who now man British ships, and who look upon the application of cold water to the human frame as nearly equivalent to the cat-o'-nine tails. It is by no means uncommon to find men come on board with only one suit of underclothing, and sometimes even they are the happy possessors of one solitary shirt which they wear from the beginning to the end of the voyage; it may therefore be imagined that this practice, though certainly economical, is by no means conducive to health. Of course the only way to avoid the evils of uncleanliness is by the master as far as possible exercising proper supervision over his crew and insisting on daily ablutions—the cold douche thoroughly applied would be a fitting punishment for this class of offenders. We think also that the supply of water allowed, viz., three quarts per day for all purposes, is by no means sufficient, and should when possible be largely increased.

4th. Bad quality of the provisions. It appears probable that salt meat, if good and recently cured, is not to any great extent more productive of scurvy than fresh meat—at any rate it has been proved that the disease may prevail when fresh meat alone is given. Salt however, like charity, may cover a multitude of sins, and previously tainted, diseased and otherwise unwholesome meat may have their noxious properties concealed and perhaps partially corrected by being salted. It often happens that casks of beef and pork which have been on the ship for twelve or eighteen months and have become sensibly tainted, receive a fresh veneer of pickle and are reshipped for another voyage. To all outward appearances the meat looks sound and smells tolerably sweet, but as soon as

the salt is to some extent removed by soaking and boiling and the joint is placed on the table, then it at once becomes painfully apparent both to the palate and the nostrils that "there's something rotten in the state of Denmark." Meat which has been only once pickled generally contains a certain amount of blood which is apt to decompose in hot weather, and it is therefore important that all recently-cured provisions before being shipped for a tropical voyage should be re-pickled. Sometimes it happens that the bread on board ship becomes mouldy and swarms with maggots and weevils. We certainly very seldom hear in the present day of a couple of biscuits running a race across the table, as was said to be formerly the case in the Navy, but we have frequently broken a biscuit in two and seen the maggots themselves running away. If biscuits are properly baked in the first instance and kept in air-tight tanks, they will keep in good condition for a very long period, and it is therefore due to improper care being taken that they ever become partially changed from the vegetable to the animal kingdom. There is, however, no doubt whatever that food in an incipient stage of decomposition is a very powerful agent in the development of disease—first of all diarrhœa, dysentery or putrid fever will appear, to be afterwards followed by a genuine attack of true scurvy. The only means to prevent bad provisions from being shipped would be by periodical inspection. Impure water is very often blamed for an outbreak of scurvy, and although we think this cause is somewhat overrated, yet it is quite possible that it may often be a factor in the case. Water containing decomposing organic matter would act very much in the same way as putrid food, and cause similar results. In several instances we have found in the course of enquiry that an attack of boils has broken out among the crew after the use of bad water, and that scurvy has afterwards developed from this condition. It is therefore of importance that great care should be exercised in the selection of water for drinking purposes, and where there is reason to suspect its purity it should always be filtered. A filter such as that patented by Captain Crease, R.M.A., and which is highly recommended by the late Dr. Parkes, should be carried on every ship. It should also be remembered that boiling will destroy all the germs of animal life in water.

5th. Breathing impure air may be reckoned among the predisposing causes, acting by lowering the tone of the system and inducing a cachectic condition of the body—hence the importance of good and sufficient ventilation in the forecastle. We are acquainted with at least two instances in which scurvy appeared to spread from one man as a centre, attacking those who slept close to him and leaving those at a distance exempt, in such a remarkable manner as almost to induce the belief that it is more contagious in its nature than is generally thought. This however may possibly be explained by the fact that the effluvium arising from a patient suffering from scurvy is very bad, and that those breathing the tainted air were thereby rendered more liable to an attack. There is no doubt whatever that exposure for some time to the pernicious influence of a malarious district greatly aids in developing scurvy. We know of many cases where the crews of ships trading to some of the African ports have more or less been laid up with some form of the malarious fevers, and a short time after proceeding to sea true scurvy has broken out in an aggravated form.

6th. Wet and exposure to cold, with deficient clothing and excessive labour, will assist in developing the disease.

The six causes we have enumerated may be considered to be secondary and antecedent in their nature, but although they greatly assist and predispose to, yet it is doubtful if *per se* they ever directly cause an attack of scurvy. In every case the one invariable condition which always prevails, and which therefore may be looked upon as the *vera causa*, is a deficiency of vegetable food. In every case we know of this deficiency has more or less prevailed, and until a change takes place in this respect, the disease will never be thoroughly eradicated. As previously mentioned, the use of lime-juice has greatly tended to diminish the frequency of scurvy, but where the pre-disposing causes are in operation it will not always prevent it; thus, out of twenty outbreaks which we have investigated, we could only trace its origin to a neglect in administering this liquid in four instances, and in all four the master was fined for failing to comply with the Act. This is sufficient to prove that a change in the present system of feeding sailors is imperatively demanded.

In considering the present scale of diet, it at once becomes apparent to a scientific enquirer, that it has been constructed with a total disregard to the physiological wants of the system; that in addition to its monotonous character and lack of vegetables, the proportion of the different ingredients is altogether wrong. Physiologists divide food into two great groups: 1st, the nitrogenous or flesh-formers; these comprise vegetable albumen, fibrine and caseine, and animal flesh and blood. This class is supposed to build up all the tissues of the body and to repair its ordinary waste, and is composed of carbon, hydrogen, oxygen, and nitrogen; 2nd, the non-nitrogenous, carbonaceous or heat-producing substances, comprising fats, sugar, starch, gum, &c. These are composed of carbon, hydrogen, and oxygen, without the nitrogen, and are supposed to be incapable of building up the body (except the fat), but they unite with the oxygen we inhale by our lungs, and are, in fact, literally burnt like a piece of coal and converted into carbonic acid and water. In the act of burning they give out a certain amount of heat which keeps up the mean temperature of the body, and a certain amount of force by means of which the heart beats, the brain thinks, and muscular and organic actions are properly performed. For all practical purposes we may accept this definition as mainly though not absolutely correct (for the waste of the nitrogenous tissue also supplies heat and force), and the next point is to determine the proportion that these two groups should bear to each other. It has been proved by numerous experiments that for healthy nutrition the nitrogenous should bear to the carbonaceous elements the proportion of 1 to 5 on an average. If, however, we make calculations as to the proportion which actually exists in the ordinary dietary scale of sailors, we arrive at the conclusion that the flesh-formers (owing to the large quantity of meat) are much in excess, and stand to the heat-producers in about the ratio of 1 to 3. The following is the ordinary scale of diet with its constituent parts—the carbonaceous elements are reduced to one uniform standard, that of starch—starch, gum, and sugar being about equal in value, whilst fat is nearly double. We have also calculated the price.

							Nutritive Value.	
							Flesh-formers.	Heat-givers.
					s.	d.		
Bread	7	lbs.	at 1½d.	per lb.	=0	10½	0·994 lbs.	5·019 lbs.
Flour	1½	„	„ 2d.	„	=0	3	0·210 „	1·104 „
Peas ...	1	„	„ 1½d.	„	=0	1½	0·220 „	0·634 „
Pork ...	3¾	„	„ 5½d.	„	=1	8¾	0·506 „	1·620 „
Beef ...	6	„	„ 5d.	„	=2	6	1·242 „	1·037 „
Sugar	14	oz.	„ 2½d.	„	=0	2¼	—	0·796 „
Tea ...	1¾	„	„ 1d.	per oz.	=0	1¾	—	—
Coffee	3½	„	„ 9½d.	per lb.	=0	2½	—	—
Rice ...	8	„	„ 1½d.	„	=0	0¾	0·032 „	0·405 „
Cost per week...				...	6	1	per week 3·204 „ =	10·614 „
							per day 0·458 „ =	per day 1·516 „ =
							„ 7·328 oz.	„ 24·246 oz.

The sailor in the Merchant Service therefore receives per diem oz. 7·328 of flesh-formers, and oz. 24·246 of heat-givers, and the former stand to the latter in the ratio of 1 to 3·3.

In the scale allowed in the Navy the flesh-formers = oz. 5, and the heat-givers 20·4, making the ratio as 1 to 4.

In the Army the flesh-formers = oz. 4·2, and the heat-givers 22·06; the ratio being 1 to 5·2.

An English navvy, working on a railway, receives of flesh-formers oz. 6·8, and of heat-givers oz. 37; the ratio being as 1 to 5·4.

Dr. Letheby is of opinion that, speaking generally, a man requires daily in his food the following amounts at least of carbonaceous and nitrogenous matters for idleness, for ordinary labour, and for active labour :—

Daily Diets for	Flesh-formers.	Heat-givers.	Ratio.
Idleness ...	oz. 2·67 ...	oz. 19·61 ...	1 to 7
Ordinary labour	„ 4·56 ...	„ 29·24 ...	1 to 6·4
Active labour ...	„ 5·81 ...	„ 34·97 ...	1 to 6

Thus it becomes apparent that the diet of merchant sailors contains a greater amount of nitrogenous ingredients than is required for a man in active labour—greater even than a navvy

employed in the very severe work of a railway cutting consumes. In the following scale we have reduced the amount of flesh-formers and increased the heat-producers, and thus brought the ratio to about the proper proportion, the quantity of each of these constituents being very liberal:—

				Nutritive Value.	
		s. d.	s. d.	Flesh-formers.	Heat-givers.
Bread	7 lbs. at	0 1½	=0 10½	0·994 lbs.	5·019 lbs.
Flour	1½ „ „	0 2	=0 3	0·210 „	1·104 „
Peas	12 oz. „	0 1⅓	=0 1	0·147 „	0·411 „
Salt beef... ...	3 lbs. „	0 5	=1 3	0·620 „ 10 per cent. allowed for bone.	0·518 „
Salt pork ...	1½ „ „	0 6	=0 9	0·203 „	0·648 „
Preserved meats	1½ „ „	0 6	=0 9	0·345 „	0·288 „
Oatmeal	8 oz. „	0 2	=0 1	0·080 „	0·382 „
Rice	8 „ „	0 1½	=0 0¾	—	—
Fresh vegetables or	4 lbs.				
Preserved potatoes	12 oz. „	0 4⅓	=0 3¼	0.056 „	0·908 „
Pickles	½-pint „	0 6	=0 3		
Sugar	1 lb. „	0 2½	=0 2½	—	0·915 „
Butter	8 oz. „	1 4	=0 8	0·005 „	1·030 „
Suet	4 „ „	0 6	=0 1½	—	0·520 „
Molasses ...	½-pint „	0 1½	=0 0¾	—	0·457 „
Raisins	8 oz. „	0 4	=0 2	—	0·250 „
Mustard	¼ „ „	0 1	=0 0¼	—	—
Tea	2 „ „	1 4	=0 2	—	—
Coffee	4½ „ „	0 9⅓	=0 2⅝	—	—
Rum	1 gill „	—	0 3	—	—
Cost per week			6 6	per week 2·692 lbs. =	per week 12·855 lbs.
				per day 0·384 „ = 6·144 oz.	per day 1·836 „ = 29·376 oz.
				Ratio nearly as 1 to 5.	

The advantages of the above scale consist in the greater variety in the supply of fresh meat and vegetables in lieu of a certain portion of salt meat, and in the proper ratio of the constituent parts being more nearly obtained, whilst the cost is very little more, and cannot be considered excessive. There is no doubt

sailors are a peculiar race of beings, and very conservative in their instincts; and it is therefore quite probable that some of them might at first grumble if not allowed their usual quantity of salt junk—like pigs, who are not happy unless they can return to their wallowing in the mire—but unlike pigs, they possess the gift of reason, and are therefore capable of being educated up to the point. There is no doubt whatever, that too much animal food is not good for anyone, especially in hot climates. It will injure the digestion, derange the liver, produce a feverish condition of the blood, and predispose to scurvy. The quantity proposed is sufficient, and more than sufficient, for all the wants of the system, and should not be exceeded. We are also disposed to think that salt meat is, to a certain extent, more provocative to scurvy than fresh; whether it be that the salt in itself is injurious, or whether it be because a great deal of the juice of meat, containing much nutricious matter, organic and mineral (phosphoric acid, lactic acid, potash, and magnesia) finds its way into the brine, it is impossible to say with certainty. In the present day, with such an abundant supply of preserved meats, there is positively no excuse for keeping up the old system of alternating salt beef with salt pork, and the English are the only nation who adhere to it. There is no doubt that fresh vegetables, potatoes, turnips, carrots, and onions, are more antiscorbutic in their nature than preserved ones, possibly because in the latter some of the salts become decomposed, as is sometimes the case with the citric acid in lime-juice. A sufficient supply of fresh vegetables should, therefore, be put on board to last for at least two or three months (as may generally be done), and these should be replenished whenever possible. It may perhaps cause the hair of some of our teetotal friends to stand erect with horror, like the proverbial "quills upon the fretful porcupine," and provoke a shriek of hysterical indignation to find that we have included a ration of rum in the bill of fare, but we are certainly of opinion that not only would it tend to keep up the men's spirits, but would also materially assist the digestion both of hard salt and likewise of preserved meat, the latter being certainly somewhat deficient in flavour, and, therefore, unable properly to stimulate the secretion of the gastric juice. Those who maintain

total abstinence principles for fear of excess, should bear in mind that sailors, when they come on shore, frequently make up for their long privation by rushing into the other extreme, and that the instances are very rare indeed where they lose their taste for stimulants by doing without it on board ship. We have endeavoured in the foregoing remarks, to point out the main causes of scurvy in the Mercantile Marine, and to indicate the proper remedies to be adopted, and, in conclusion, beg to reiterate the assertion that it is pre-eminently an unnecessary and preventable disease, and that its frequent occurrence in the latter part of the nineteenth century, with all its "appliances and means to boot," is nothing less than a grievous scandal.

THE NEW MODE OF DISCHARGING CREWS.

FROM a recently issued Parliamentary Return we are enabled to gather some interesting particulars relating to the working of the new system of discharging crews and of transmitting wages that is now being tested in the port of London. The system has been in force since February, 1878, and the details now supplied show to what extent seamen are availing themselves of its advantages.

The Return covers the twelve months ending 31st March, 1879, during which period we find that 1,728 men proceeded home immediately on arrival in port, leaving their balances of wages to be transmitted through the Mercantile Marine Offices, while in 741 cases men expressed a desire to take advantage of the new arrangement, but were, from various causes, prevented from doing so. The aggregate amount of the wages transmitted during the period in question was £25,695 4s. 9d. In connection with the foregoing figures the Return contains statements showing the annual amounts of the Seamen's Money Orders issued at the port of London during the last six years, together with the annual amounts of the Savings Bank deposits for the same time. These are as follows :—

TOTAL AMOUNT of the SEAMEN'S MONEY ORDERS issued in the Port of LONDON, in each of the last SIX Years.

		£	s.	d.
1873-4	... ...	97,184	17	8
1874-5	... ...	94,118	8	11
1875-6	... ...	97,622	4	5
1876-7	... ...	98,059	1	10
1877-8	... ...	97,546	0	0
1878-9	... ...	94,670	18	8

TOTAL AMOUNT of the DEPOSITS in the SEAMEN'S SAVINGS BANK, in the Port of LONDON, in each of the last Six Years.

		£	s.	d.
1873-4	... ...	9,315	16	9
1874-5	... ...	9,519	10	8
1875-6	... ...	9,805	6	5
1876-7	... ...	11,827	2	3
1877-8	... ...	10,511	10	9
1878-9	... ...	10,430	7	3

Doubtless the two latter tables have been called for in order to ascertain whether the advantages of the system may not be more apparent than real. It was not unreasonable to suspect that the men most likely to make use of the new arrangement would be the more prudent ones who have hitherto been in the habit of transmitting their wages by means of Money Orders, or of placing a portion of their earnings in the Seamen's Savings Bank. Had the amount of the Money Orders issued, or of the deposits in the Savings Bank in the London shipping offices shown a considerable falling off during the last twelve months, there would have been fair grounds for assuming that the more careless and improvident men—precisely those for whose benefit the new system has been devised—are reaping none of its advantages, and that its establishment is merely having the effect of substituting one means of protection for another. But a momentary glance at the Returns will suffice to show that such is not the case. Although the amount of the Money Orders issued during the year 1878-9 is about £2,000 below the average for the six years given in the Return, the

deficiency is trifling when compared with the total amount of wages transmitted under the new arrangement. At all events, it is quite clear that upwards of £25,000 has been forwarded through the official channel during the twelve months in question; and the percentage on this amount that, under the old system, would have found its way into the hands of the swarm of crimps and harpies whom Jack has to encounter on coming ashore, must represent a very considerable sum. It may be that £25,000 is small in comparison with the total annual amount of wages paid in the port of London to men belonging to other ports, but it must be remembered that the scheme has not long been in force, and when its conditions become more generally known there is every reason to believe that its advantages will obtain a much wider recognition.

It is evident, however, that if the new arrangement for discharging crews is to become a permanent success, it will have to be applied to other ports as well as to London. It will be a manifest disadvantage to shipowners in London for large numbers of seamen to be sent away immediately on arrival, if none are brought from elsewhere to fill their places. Such a one-sided system could hardly fail to create an artificial scarcity of hands, and the result of this would probably be an increase in the rate of wages. It is to be hoped, therefore, that if the scheme continues to work satisfactorily, the authorities will soon see their way to extending it to at least three or four of the principal ports in the kingdom. From the Return it appears that the greater proportion of the seamen proceed to Liverpool, Glasgow, Cardiff, and the Tyne ports, and it is desirable that these places, at all events, should be brought under the operation of the new arrangement.

The steam launch *Midge* seems to be doing excellent service in impeding the business of the crimp. No fewer than 927 outward bound, and 1,914 homeward bound ships were visited during the twelve months ending on the 31st March last. This gives an average of almost eight vessels per day; and in the face of such constant vigilance as this, the crimps must find their occupation upon the river a somewhat arduous one. But there is only too good reason for fearing that the business of the crimp will never altogether cease to exist so long as seamen are put on shore

penniless, and kept waiting two or three days before they are paid the wages due to them. For men in this position there is but one alternative, and although the floating police may succeed in keeping them out of the grasp of their "friends" until they are fairly in dock, the evil is delayed only for a few hours. The Board of Trade have recognized this fact, and by devising the scheme for furnishing seamen with a few shillings in ready money, and travelling passes to their homes, immediately on arrival in port, they have provided the means of absolute security from risk; and of those who still neglect to take advantage of those means, and who prefer to be hocussed and robbed in the old and time-honoured style, their best friends can hardly say that they deserve a better fate.

COAL CARGOES (SPONTANEOUS COMBUSTION, &c.)

(*Communicated.*)

IT is highly satisfactory to find that the article on coal cargoes, in the June number of the *Nautical Magazine*, should have awakened the attention of those who are interested in the safety of coal-laden ships to the necessity for better means of security than any heretofore resorted to. On the other hand, it is as much to be deplored that those whose paramount duty it is to encourage the impartial consideration and discussion of suggestions that have for their object the safety of life and property at sea, should be amongst the first to decry them, and, evidently without due examination, seek to impair their value by misrepresentation and imputation of wrong motives.

That the article in question has had considerable weight with persons of intelligence and experience is evidenced by the frank admission of the eminent shipbuilders, Messrs. Turnbull & Sons, of Whitby, who have heretofore relied on the ventilation of coal-laden ships as the best remedy against explosion. When the long cherished opinions of sensible and thoughtful men are, by their

own honest confession, shaken, there is reason to hope that such opinions, if found on due examination to be erroneous, may give place to wiser counsels.

Messrs. Turnbull & Sons were the builders as well as principal and managing owners of the iron-screw steamship *Streonshalk*, which cleared from Newport, on the 10th April last, for Savona, in the Mediterranean, with a cargo of 1,695 tons of South Wales coal on board, besides 348 tons of bunker coal. Her hatches were open for the first three days to allow the gases to escape, and there was provision made for ventilation with cowls on deck. But early in the morning of the third day (12th June), in consequence of rough weather, the hatches were battened down, and in less than twenty-four hours an explosion took place, causing serious damage to the vessel and persons on board. The ship caught fire, and her steering apparatus having been carried away, she became unmanageable.

Whilst thus at the mercy of the elements, a small vessel, the *Lord Mar*, fortunately fell in with her, and succeeded in getting her into Vigo, but for which timely help her fate might have been like that of the fifty-two missing coal-laden ships, which mysteriously disappeared with their passengers and crews. This catastrophe was entirely owing to the shipment of that dangerous cargo, steam coal. The vessel, however, was sufficiently repaired to return to Whitby. An enquiry was directed by the Board of Trade. Mr. Rothery, as Wreck Commissioner, with Commander Forster, R.N., and Captain Sceales, as Assessors, was appointed to hold the enquiry. It took place at Newport on the 4th ult. Mr. Ravenhill appeared as counsel for the Board of Trade, Mr. Ingledew for the owners, and Mr. Pain for the master. After hearing the respective parties, the Commissioner, in delivering the judgment of the Court, needlessly travelled out of his way to express opinions which it would seem he was neither practically qualified, nor officially called upon to give. Mr. Turnbull had, as already stated, observed that he had theretofore relied on ventilation to prevent explosion, but that his views had been much shaken by the article in the *Nautical Magazine* on coal cargoes; and the Commissioner, reverting to that observation, instead of

counselling Mr. Turnbull to give his serious and impartial attention to whatever had so important an object in view, recurred to the remarks of Mr. Ingledew, who had, with the pardonable zeal of an advocate to serve his clients, put an adverse construction on the article, and, to weaken its effect, imputed motives to the writer which the Commissioner took upon himself to indorse. Presuming, it would seem, that the accident of his being appointed a Commissioner for these inquiries constituted him an authority on scientific questions, he affirmed that "the article exhibited a more than ordinary confusion of ideas on the subject of explosion of coal-gas and spontaneous combustion of coal." A glance at the 515th and two following pages of the magazine will show at once how unjustifiable and wide of the mark is that observation. The fact is palpable that more than ordinary care had been taken in that article to draw as clearly as possible the distinction between explosions of coal-gas and spontaneous combustion of coal. The origin, cause, and peculiar characteristics of each, as far as they have been scientifically ascertained, are elaborately explained in two distinct paragraphs, whilst another, equally distinct, is devoted to the consideration of the two sources of danger to which coal cargoes are subject, and the properties and results incident to and common to both.

The article then proceeds to offer a succinct analysis of the figures given by the return of the Board of Trade to the House of Commons on the motion of Mr. Childers, under the four different heads adopted in that return. It is needless to repeat them, as the question under consideration was not whether the prevalent cause of disaster in coal cargoes was spontaneous combustion or explosion, but whether *ventilation* was an efficient safeguard against the calamities to which coal-laden ships are liable. Bearing in mind, therefore (taking the words of the article itself), that "the desideratum required was a remedy which, whilst calculated to avert one species of danger, will not create another," the total results of the four classes was given thus :—"Of the sixty-five ships the subject of spontaneous combustion and explosion, forty-two, or nearly two-thirds, were ventilated ; and, in the majority of cases of total loss and abandonments, ventilation existed."

Where is the confusion of ideas in this? Could a fairer method be adopted of arriving at the average result of ventilation in the cases indicated? As there is no obscurity in the above deduction from the four heads referred to, the only * *head* in which there appears to have been any confusion of ideas is that of the Commissioner himself. Nothing could have been more disingenuous than the following misquotation: "The reviewer takes all the cases of spontaneous combustion and explosion mentioned in Mr. Childer's return for August last, lumps them together and arrives at the conclusion that ventilation is not a remedy for *explosion*," yet he deliberately asserts this in the face of what immediately follows, viz.: "It may be," says the article, "that the ventilation, in many of these cases, was imperfect, otherwise, unless there are other countervailing circumstances to be taken into account it might be inferred that ventilation is rather conducive to than preventive of *disaster*," not of *explosion*, as misquoted by the Commissioner. Reverting to the Board of Trade return, and taking both kinds of disaster together, it is clear that in the majority of cases ventilation did not avert the danger to which coal-laden ships are liable, and which was all that the article contended for. This derives additional force from the fact that in ten out of sixteen cases of total loss and abandonment,

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[* Whatever confusion there may or may not be in other heads there is none in ours. To clear up the whole question at issue between the Wreck Commissioner and our contributor we may state (but we expect our readers know it pretty well) that—

1. To guard against the danger of *explosion* of gas given off by a coal cargo, the remedy recommended by the Royal Commissioners is "*surface*" ventilation.

2. As regards the *spontaneous combustion* of the coal itself while in the hold, nothing that may be called a remedy dealing with a loaded ship has been proposed; but "*through*" ventilation, which is a vastly different thing from "*surface*" ventilation, is condemned.

3. Ships carrying coal cargoes should always have *surface* ventilation sufficient to carry off the gas evolved. *Surface* ventilation will probably prevent the accumulation, and therefore the explosion of coal-gas, but it cannot possibly either prevent or cause spontaneous combustion in the lower body of the cargo.

ventilation existed. *A propos* to this Mr. Rothery, in his judgment, thus interprets the Report of the Royal Commissioners, "surface ventilation was all that was required to prevent explosion, but that ventilation, or rather through ventilation, conduced to spontaneous combustion." Having truly arrived at this conclusion, perhaps he will be good enough to inform the shipper of coal how to discover, before his vessel clears out, which of the two evils he may have to guard against? If explosion, of course he must resort to surface ventilation; if spontaneous combustion, he must show ventilation as the height of folly.

Here then is the amusing dilemma, on the horns of which the learned Commissioner has so complacently seated himself. He admits that ventilation, however efficacious as a preventive of explosion, is conducive to spontaneous combustion; yet, whilst unable to instruct the shipper to which of these evils his cargo may be subject, his perceptive powers must be sadly at fault if prepared to deny in the face of the fact that 117 coal-laden ships have come to grief in the short space of two years, that some better safeguard for life and property at sea than surface ventilation is an imperative necessity. Perhaps upon more mature reflection, he may arrive at the salutary conclusion that it would be more consistent with the ultimate object of Board of Trade inquiries into casualties at sea, for those who conduct them to

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4. If the particular patent fuel of the kind referred to by our contributor is not liable to spontaneous combustion, and does not give off gas, it does not need surface ventilation.

5. There have been, according to the last wreck return (excluding collisions) 1,052 casualties, and losses of coal-laden ships. Of these, 19 were known cases of spontaneous combustion of coal cargo, 10 were known cases of explosion of coal-gas, and 993 were losses, of which the cause had nothing to do with either spontaneous combustion of cargo or explosion of coal-gas; and in 30 cases the causes of the loss were quite unknown. The *known* cases in which the remedy of *surface* ventilation was applicable were therefore exactly 10, or if we deal with total losses only, then the last return shows 173 total losses of coal-laden ships, of which 10 are known to have been caused by spontaneous combustion of coal cargo, and of which not one is reported as caused by the explosion of coal-gas.—ED.]

encourage rather than disparage well-meant suggestions, for the prevention of such calamities. The skilled shipbuilders, Messrs. Turnbull, placing faith in ventilation, and actuated by every motive to do their best for the safety of their own vessel and cargo, adopted in the *Streonshalk*, a system, with reference to which the learned Commissioner himself said, in giving the judgment of the Court, "We should be disposed to say that this vessel was exceptionally well ventilated." But what happened? The cargo of this admirably ventilated ship had the great advantage of being carefully shipped, in proper condition. The vessel proceeded to sea with hatchways open until the third day for the gases to escape, the cargo was properly trimmed, but on the third morning, because the wind chopped round and began to blow hard, the hatches were closed. Here be it observed that as the dangerous gases are liberated from the cells of the coal by friction or trituration and breakage, which are caused by and increased in proportion to the rolling or vibration of the ship, the hatches in this case were closed, of necessity, just when the process of liberation and consequent danger of explosion would, from the violence of the gale, be greater. A stronger comment than this, on the fallacy of relying upon ventilation for safety, cannot well be afforded. Ventilation abandoned, when most needed, at the bidding, so to speak, of the fickle breezes of the Bay of Biscay, which actually augment the danger! Doubtless such practical considerations as these went far to impress upon the mind of Mr. Turnbull the truthfulness of the article on "Coal Cargoes" which so shook his faith in the efficacy of ventilation.

The imputation in which the Commissioner indulges is, that that article was not written for the information of shipowners and shipmasters, but in the interest of Patent Fuel Companies. What proof has he of this? And if it were so, what matter, provided the course recommended serves the best interests of the coal shipper and shipowner too? What would the Commissioner say, were it imputed that his object is to suppress every tendency to the prevention of disaster at sea, for fear the occupation of the Commissioner should be gone?

Whatever the motives which dictated the article that the Com-

missioner derides, one plain fact presents itself, which he doubtless would have controverted if he could ; it is, that explosions of coal-gas and spontaneous combustion in coal cargoes would no longer occur, if the coal were divested of its dangerous properties by conversion into patent fuel. If he can point out any better method of averting these terrible catastrophes he will confor a great obligation on the shippers of coal, the owners of coal-carrying ships, and the insurers of coal-laden ships and cargoes, and at the same time render an inestimable service to the cause of humanity. The sooner he does so, if he can, the better, as the terrible sacrifices of life and property for want of some such measure go on in a fearfully increasing ratio. What it will be when trade revives, and coal-carrying cargoes are redoubled, it is difficult to say. The return of the Board of Trade for the two years ended 14th August, 1878, gave as missing fifty-two coal laden ships, and the "Abstract of Sea Casualties, 1877-8," in the July number of the *Nautical Magazine*, gives thirty as the number missing in the latter year, showing an increase of nearly one-third over the preceding year. After stating that "the most gratifying point in the Abstract is the decrease in the number of missing vessels bound over sea," though still extremely awful, the fact is thus announced: "We regret, however, to find that there is no decrease in the number of lives lost in coal-laden vessels, of which no less than thirty with 312 men on board were missing," and this in a year peculiarly "favourable to shipping as compared with recent years," and "chiefly owing to the absence of great storms."

This growing pre-eminence in disaster acquired by coal-laden ships and continuing through a period so favourable to navigation generally, precludes any other conclusion than that this unenviable notoriety is attributable, not to the elements, but to the dangerous consequences to which coal cargoes are liable. It is reasonable to infer that the lives of a large proportion, at all events, of the 312 men who have thus miserably perished in a single year would have been saved, had the 30 ill-fated vessels been freighted with sound patent fuel, instead of inflammable and dangerous gas-giving coal. Nor should the sacrifice, in vessels and cargo, of

probably more than £100,000, to the heavy cost of underwriters, be forgotten. Compare this with the trifling outlay which would have sufficed to divest every ounce of that coal of its dangerous properties, without detriment to its heat-giving and steam-producing power, to say nothing of the advantage of fitting it to endure long voyages, and resist the deteriorating influence of tropical climates, so detrimental to coal. It is clear that, in a commercial as well as philanthropical point of view, the adoption of patent fuel for sea-going purposes would be immensely advantageous to all parties concerned, from the coal-owner to the ultimate consignee and consumer.

In the face of these facts, despite the strictures of the Commissioner on the article relating to "Coal Cargoes," and his pet theory of ventilation, which at the best is but an uncertain remedy for explosion, whilst actually conducive to spontaneous combustion, to which cause all the cases of total loss and abandonment, recorded in the Board of Trade Return, are attributed, it is not too much to say, that, as the use of patent fuel furnishes immunity from both causes of danger, it almost savours of criminality not to prefer it to coal for sea-going purposes; at all events, until some better substitute can be found.

HOW DO STORMS ORIGINATE.*

I AM of opinion that one of the principal features of cyclones is the approach of two strong opposite currents towards each other, or, as I prefer to call them, two or more rotating waves. In the remarks which follow I must be understood as referring to extra-tropical storms, and especially to those experienced over these islands, as I have not sufficiently studied the inter-tropical cyclones to form an accurate opinion regarding them. It may be as well here to anticipate an objection which possibly may be urged against the

* This paper is intended by the author to explain more fully the Table of Currents which is compiled monthly by him.—Ed. *N. M.*

reasoning respecting the oscillations in the atmosphere caused by the primary depressions. My remarks proceeded a good deal on the assumption that these oscillations would be transmitted with undiminished force from the equator to the pole. This, however, is not strictly correct, for oscillations in the atmosphere diminish in amplitude as they recede from the centre of disturbance because they have to act upon an ever-increasing area. This is very apparent in sound waves; and we know that a severe storm may be raging over the Atlantic, and the barometer over these islands may remain nearly unaffected. But those depressions and oscillations are merely the counterparts of others occurring in the earth, and this objection does not apply with so much force to these.

That the changes in the atmosphere are nearly coincident with changes in the earth's attractive force the experiment alluded to in a previous paper puts beyond doubt. Although it is considerably more than a year since I first made the experiment, and observed that the rise and fall of the mercury was nearly synchronous with that in the ordinary barometer, I could never bring myself to believe it, but attributed the action to some defect in the instrument, considering that I was unsuccessful in excluding the outer air. By repeated experiment I am now, however, thoroughly convinced that this is not the case, and that the mercury rises and falls on account of the varying attraction of the earth on the air within the vessel; and this for two reasons—first, the larger the vessel employed the greater the movement of the mercury becomes, and this would not happen if it had any connection with the atmosphere; and second, it rises and falls whilst the ordinary barometer remains steady. A notable instance of this occurred in February (I cannot remember the exact date), when it fell a distance corresponding to two-tenths of an inch, the ordinary barometer remaining steady; on the 8th of March it fell one-tenth, the moon being nearly full on that day. Generally speaking it is earlier in its indications.

As the depressions occurring within the tropics cannot to any great extent affect the atmosphere in our neighbourhood, the question naturally arises, how do our depressions originate?

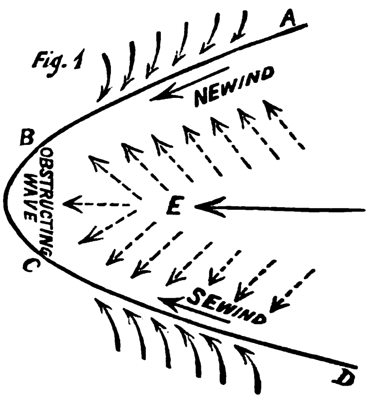
Now, I think I have sufficiently shown that they are caused by the movements of the great gradients, and these are set in motion by the intertropical depressions. It is perfectly clear that a very slight movement of these areas of high pressure will cause a very considerable movement near their skirts. This is seen in the tidal oscillations, which are very decided in shallow waters, but very slight in the open sea. Now, it is the daily adjustment of these areas of high pressure which is embodied in the table of currents, and not the daily oscillations; these latter being comparatively ineffective.

When such a movement takes place, the break will naturally occur at the weakest part. It is partly owing to this that areas of low pressure are peculiarly liable to storms, and that areas of high pressure are more permanent in their character. This movement will give rise to a current more or less rapid, and this current, when very rapid, is the generator of the storm. If, however, the current be unimpeded in its course it will not likely give rise to a storm. It is when the current meets with an obstruction that a storm results. Let us look for a moment at the great generating current within the tropics, which follows the primary depression in its westward journey. When this current receives a check, as it must do to cause the trades, it becomes a falling wave, and the rear of the current still pursuing its course, a depression is formed, which varies in depth according to the force of the current. This is the real cause of most of our storms and strong winds, viz., a strong current receiving a check. Another frequent cause is two strong opposite currents previously holding each other in check, and one of them suddenly giving way. And here I would direct attention to a point in the table of currents worthy of notice. Supposing the force or tendency is strong from the north, and the weather remains comparatively fine, we should watch narrowly the time when the tendency diminishes in force, as the current will then begin to receive a check. In a train travelling at a high rate of speed all goes well so long as the line is clear, but should it unfortunately meet an obstruction in its path, we are too well acquainted with the disastrous results which would ensue. For the same reason times of sudden transition in the force or tendency are to be noted, as for instance on the 13th,

14th, and 15th March, when the force changed from 8 to 4 then to 0. Similar sudden changes occurred on the 7th, 8th, and 9th of May, and a very sudden change occurs about the 5th of June from 6 to 0. Generally speaking, *cæteris paribus*, a change of 3 or more is indicative of unsettled weather. The weather was very unsettled during these periods.

In every stream the centre of the current is the lowest part, and varies in depth according to its rapidity. Two waves are therefore developed on each side of the current, being motions of the water or air, as the case may be, towards the centre or lowest part. These wave-motions I have already amply shown will rotate the one on the right-hand side of the current with watch hands; the other on the left, against watch hands, and these motions are sufficiently conspicuous in every stream.

The large arrow E, Fig. 1, represents direction of the generating equatorial current; the broken arrows exhibit the current becoming a falling wave owing to the obstruction at B C; the arrows outside the crests of the waves A B and C D showing the rising motion feeding the N.E. and S.E. trades.



The greater the rapidity of the current and the more decided the obstruction, the stronger the wave motion towards the centre will become.

The extra tropical currents differ from the equatorial in this important respect, that they possess a rotatory motion. This rotatory motion is with watch hands in the northern hemisphere, and consequently it will increase the ordinary rotation on the right side of the generating current and diminish it on the left side. In every cyclone there are thus three parts:—First, the generating current, second, the wave motion on the right-hand side with watch hands, and third, the wave motion on the left.

In the latter, and also in the generating current, there is a double circulation; in the current the predominating rotation is against watch hands, but in the left-hand wave with watch hands. Does this double circulation account for the heavy rainfall usually experienced in these two parts of the cyclone?

Now the tendencies in the Table of Currents show the general direction which these generating currents will probably take. Take an example to illustrate this point, and perhaps Mr. R. H. Scott will allow me to avail myself of a cyclone treated of in his useful work "Weather Charts and Storm Warnings," viz., that for 29th November, 1874. According to the views stated above the generating current in that cyclone was from the W.N.W., the southerly wave was so strong that the strongest wind coincided with the direction of the current. The wind over the Bay of Biscay was at first southerly, and swept round to W.N.W., thus placing itself in a line with the current. On the left side of the current the tendency of the wind was to back from S. to E. Turn to the *Nautical Almanac* for that date, and you will find that the moon was going south, and its declination being about 19° N., the strongest tendency was from the W.N.W. Take another example from the same work, the cyclone of February 2, 1873, and an examination of the chart shows that the generating current was from the S.S.W. On that date the moon was about 3° N.D. and coming north, and the strongest tendency was from the S.S.W. Could clearer proofs be desired?

In the cyclone of the 29th November, 1874, the direction of the generating stream was from the W.N.W., whilst the motion of the area of lowest pressure was from W.S.W. to E.N.E. This was, I believe, caused by the southerly wave being the stronger, and pushing the northerly wave before it.

These areas of low pressure, round which so many controversies have been waged, I would venture to term "will o' the wisps," which no sooner you think you have than they either entirely disappear or reappear in a totally unexpected quarter. I believe it would be as easy to find a perfectly circular or elliptical depression in the atmosphere as to discover a similarly-shaped valley among the mountains. D. D.

THE ITALIAN MERCANTILE MARINE.

AN article in a recent number of our Italian contemporary *Rivista Marittima*, gives some particulars of the Italian Mercantile Marine; of these we extract that portion which we think will be of interest to our readers.

It appears that at the close of 1877, the vessels on the Register of Shipping were 10,742 sailing vessels, of aggregate tonnage 1,010,130; and 151 steamers, of tonnage 58,319. It being believed that a number of vessels which had been lost passed under other flags, or had been broken up were still on the Register, also that some vessels on the Register should more properly appear on the local registries of small coasting and fishing craft which are kept distinct, orders were issued for a careful revision of the Register. In 1878 it was also decided to institute a new system of registration and supervision of coasting fishing vessels, and this also occasioned a withdrawal of vessels which previously had a place on the General Register. In the course of 1878 the Register lost in sailing vessels, 110, of tonnage 1,749, broken up; 125, of tonnage 26,502, wrecked; and 41, of tonnage 9,272, sold to foreigners; and in steamers 3, of tonnage 238, broken up; 2, of tonnage 923, wrecked; and one, of tonnage 21, sold to foreigners. A further diminution of tonnage of sailing vessels is caused by the remeasurements of vessels by the Moorsom Rules which were adopted in Italy in 1873. It appears that the average reduction in the tonnage of sailing vessels from that under the old Italian Rules is 5 per cent., while in steamers, on the contrary, the tonnage is augmented by the Moorsom Rule to the extent of 29 per cent. on the average. The loss of tonnage from the Register due to remeasurements of sailing vessels, during 1878, was 4,396 tons. The total loss from all the causes we have enumerated amounted to 2,613 vessels and 78,362 tons.

Considering the augmentation during the year 1878, we find the increased tonnage of steamers due to remeasurements under the Moorsom Rule amounts to 2,841 tons. Other augments are, first, 216 sailing vessels, of tonnage 27,889, and 3 small steamers, of

tonnage 79, built in Italy during the year. As against this it is stated that in 1877 there were built in Italy 286 sailing vessels, of tonnage 37,323, and one steamer, of 23 tons, thus showing that there has been a falling off in shipbuilding in Italy during the past year to the extent of 9,378 tons. The Register also received additions in 1878 of 27 vessels, of tonnage 7,905; among which were 6 steamers, of tonnage 3,536; and during the year 64 vessels, of tonnage 556, for the first time, were put on the General Register.

The net result is that the Italian Mercantile Marine, on 31st December, 1878, on the General Register of Shipping, consisted of 8,438 sailing vessels, of tonnage 966,327; and 152 steamers, of tonnage 63,030. Of these there are 1,950 sailing vessels over 100 tons register, aggregate tonnage 830,403; and 97 steamers, aggregate tonnage 58,355. There are 364 vessels between 600 and 1,000 tons, and 19 over 1,000 tons.

BOOKS RECEIVED.

Board of Trade Inquiries: a Pamphlet printed for the Mercantile Marine Service Association. Turner and Dunnett, 4, James Street, Liverpool. 1879.

We have received a copy of this pamphlet, and having read it, can safely recommend it to our subscribers. It contains no abuse, and in this respect stands out conspicuously and eminently above the "derangements of epitaphs," recently put forward by some master mariners under the erroneous impression that they are discussing this great subject. The pamphlet is ably written by S. H. G., whom our readers will recognize, in spite of the disguise, as a gentleman well known for the value of his opinions on questions of the sort here dealt with. He makes a great feature of a point to which we called attention two years ago, viz., that the charges against the master are framed partly on his own evidence, and that to rebut them he and those who advise him must on the spur of the moment possess sufficient reserve of fact to get up a new set of evidence to upset or mitigate that already given. The suggestions made are the only practical ones we have seen, and we heartily

re-echo the writer's wish that an appeal to the Admiralty Court may be speedily established. Another suggestion that has been thrown out, though not by the writer of this pamphlet, is that a second Wreck Commissioner should be appointed. This can be done under the existing law. We say no more at present than that this pamphlet inaugurates a new era in the present agitation, that is to say, it shows that the subject can be calmly and properly discussed on broad principles, and that the "calling of names" is not a necessary part of the advocacy of the cause of the British master mariner. Liverpool has certainly forwarded the masters' cause more than London.

Navigation and Nautical Astronomy, with Special Table, Diagram, and Rules adapted for Navigating Iron Ships. By Rev. W. T. Read, M.A., Head Master and Chaplain, Thames Nautical Training College, H.M.S. *Worcester.* London: Elliot Stock. 1879.

Mr. Read has long been known as the able Instructor of the "*Worcester* boys," and as having sent into the sea-service many excellent navigators. Nothing less could be expected from an old Greenwich boy who received his earliest lessons in navigation from the famous Riddles, father and son. The book before us is not, and does not profess to be, a diffuse treatise on navigation and nautical astronomy, but a brief "course" or handbook which shall enable the student intelligently to master the principles upon which the various methods of finding a ship's position at sea are founded, while, at the same time, he may endeavour to secure accuracy of computation. Only a moderate knowledge of mathematics, an amount readily picked up without any strain on the mental capacity, is necessary to fully appreciate the theoretical teaching Mr. Read lays before the student; and the practical part is exceptionally good and clear. The work will be found particularly serviceable to navigating officers, and to the pupils in navigation schools, who aim at understanding the theory as well as the practice of navigation. The dedication is appropriate to Captain Trivett, R.N.R., the first commander of the *Worcester*, and late Chief Examiner in Navigation under the Board of Trade.

On Colour Sight and Colour Blindness in its Relation to Railway and Sea Signals. By J. R. Wolfe, M.D., F.R.S.C.E., Surgeon to the Glasgow Ophthalmic Institution, &c. London: J. & A. Churchill, New Burlington Street. 1879.

IT is stated in this pamphlet that from certain statistics given, "we are entitled to assume that of all employés on railways and at sea, 3 per cent. are colour blind, and 6·5 per cent. can perceive colours with difficulty," and the author advocates strongly, that all railway officials and sailors be carefully examined as to their colour vision before being entrusted with duties the due performance of which frequently depends upon their ability to distinguish coloured lights. We quite agree with Dr. Wolfe, and are glad to know that the Board of Trade have for some time past instructed their examiners to test candidates applying for certificates in regard to their appreciation of colours. In Dr. Wolfe's pamphlet there are some useful observations in reference to the tests employed, which we would commend to the attention of examiners. The consequences of mistakes on the part of those on the look-out for lights may be so serious that no precautions are too great with a view to prevent such mistakes occurring.

Contributions to the Knowledge of the Meteorology of the Arctic Regions. Published by the Authority of the Meteorological Council. London: J. D. Potter, 31, Poultry, and E. Stanford, 55, Charing Cross. 1879.

WE gather from the preface that the object of this work is to give a summary of the existing information as to the conditions of climate, &c., actually proved to have been experienced in the Arctic regions. The volume now published has reference to observations made at land stations only; and it is intimated that Parts II. and III. will contain particulars derived from ships frozen up, and from ships at sea within the region embraced by the investigation. The portion of the discussion now presented appears to be very fully and carefully done.

The whole work will in itself be of great value, and will no doubt be the pioneer of systematic records of observations concerning the meteorological conditions of the Polar regions.

CORRESPONDENCE.

ROUTE FROM CHINA IN THE S.W. MONSOONS.

To the Editor of the "Nautical Magazine."

SIR,—As a subscriber to your Magazine will you allow me to say a few words on the above route. Most of your readers well know that almost every year there are one or two first-class steamers lost on Cape Guardafui (or near to it), and no master can be too careful in rounding it. I have had some little experience for the last three years; have had to round it at night, when the land cannot be seen any distance for the thick haze upon it, and at all times feel a great relief when round.

This year, when leaving China, I thought to take a different route, so after leaving Penang, I proceeded through the one-and-a-half degree channel, then edged away until Latitude 3° N. east end of Sokotra bearing N.W. ½ N.; kept away, and set all fore and aft sail; wind about W.S.W.; had a nice breeze with a northerly set (no easterly current) until we made the high land of Sokotra about 4 p.m., which could be distinctly seen 20 miles off, and the east end, or Ras R'dresseh (low point), 10 miles off. After rounding this point had fine weather, strong breeze, but could still carry all fore and aft sail. I found a current setting about E.N.E. ¾ mile per hour, but only along the island.

Now, I consider this the best route to take at this time of year for several reasons, which are, better weather, less sea, and not half the risk in making the land. I also consider the distance is less than when a ship intends to round the Cape, for if you intend to go the latter way, you require to run well west before keeping north; if you don't do this, you stand a chance of getting into a strong easterly current and high cross sea. I know one case of a ship kept away too soon, and she lost 110 miles in 24 hours; the ship was logging 12 knots, but only made 178 altogether.

The low point of Ras R'dresseh would be very dangerous at night unless there was a light, which I am quite certain could be seen almost its full range, and would be of more use there than on the Cape or near it, as a first-class light could only be seen a short

distance. But what about this light on or about Cape Guardafui? It is just two years since the French mail steamer was lost, and there is nothing done yet. I think steamship masters, trading to the East, are neglecting their own interests by not striking the iron while it is hot, or we shall never get a light near this place.

Perhaps some of your readers may try this route next year, and give us their opinion, and, I think, if they try it once they will do so the second time.

I remain, Sir,
Your obedient servant,
R. J. BROWN,
Master s.s. *Deucalion.*

London,
15th July, 1879.

PORT AND STARBOARD.

To the Editor of the "Nautical Magazine."

Dear Sir,—Permit me to submit the following ideas with reference to the terms port and starboard:—

Having due regard to the fact that they are applied in opposition to the direction in which the wheel, tiller, rudder, and ship's head move, I still think that these terms and their present application can be properly retained by inserting the word *from*, and advising all maritime powers that they have that meaning.

The actual use of this word would hardly be necessary in our own marine, but its addition inserted in the Rule of the Road would put misconstruction on the part of foreigners out of the question. It would also have good effect in rendering enquiries into collision cases more clear.

Yours faithfully,
C. R. EDWARDS,
Chief Officer, P. & O. s.s. *Peshawur.*

15th July, 1879.

COMPASS ERRORS.

To the Editor of the "Nautical Magazine."

Sir,—The report of the inquiry on the loss of the steam-transport, *Clyde*, at the Cape of Good Hope, on the 3rd April last, has been published. It affords another instance of the want of attention, on the part of some masters, to the errors of their com-

passes, and I have reasons to fear that this is anything but an isolated case—on the contrary—that most of the strandings of fine, well-appointed ships are brought about by this cause, and in many cases by this alone.

The words of the report are so clear and strong, that I reproduce them :—" It is to be observed that in the vessel's progress through the Southern Hemisphere, the master's attention was called to the fact that the deviation of the compasses was undergoing considerable changes. Notwithstanding these changes, the master, before proceeding on courses requisite for the navigation of the shores of the Cape Colony, did not attempt to obtain the deviation." It goes on to say, " In the absence of his knowledge of the deviation of the compasses for this locality, he used that obtained in England, totally disregarding the fact that the change of the ship's geographical position (especially in latitude) would, under any circumstances, have a material effect on the compasses." It is worth noting that both the assessors on this inquiry were navigating lieutenants. We may, therefore, feel sure that a thorough knowledge of practical navigation was brought to bear upon it.

On more than one occasion you have permitted me in your pages to inveigh against the practice of trusting to the correctness of the deviation cards supplied to vessels at the time they are swung for adjustment, and as the subject was followed up by other correspondents, I had hoped that sufficient attention had been attracted to the evil, and that in future masters of iron ships would see the necessity of testing their compass from day to day, and that the pole or masthead compass would have been discarded. It appears this is not so, for one of those aids to laziness and negligence was, it seems by the report, on board the *Clyde*, and trusted to.

I notice that in the examination for extra masters, there is now included a syllabus, which I am informed is to test the candidate's knowledge of the cause and effects of local attraction on board a vessel, and of the methods of counteracting it. Now, Sir, I venture to think this is a step, I may say a stride, far in advance of what is required for practical navigation of the most accurate description.

I would be the last to underrate the advantages of the possession of scientific knowledge by a shipmaster, provided it were held *in addition* to the knowledge and *habit of applying* practical navigation. It may be of service to him to be a skilled electrician, or a learned astronomer, meteorologist, geologist, or botanist, but we must not lose sight of the fact, that the duty of a master mariner, and that for which the shipowner employs him, is to navigate and conduct his ship in an efficient and practical manner. Moreover, the pay of a master in these times is not calculated to induce young men of high-class attainments and education to enter the merchant service. It is with the force and direction of the wind, or the current as it exists, that a sailor has to deal, not with the causes which create them. It is the actual strength of the rope, spar, or iron, which is of moment to him, not the nature of its component parts. He has to study the peculiarities of his particular vessel, her speed, steering power, motion in a seaway, stability, carrying capacity, and so on, all matters which the practical sailor very soon finds out by experiment. To him (at the time he has to deal with the special peculiarities of his ship) it is of little value to know what causes brought them about. He is not likely to have the means at his disposal of altering them. He must deal with them, and make the best of them, and, if he should be a man of observation, and take note of his facts, his experiences may be of valuable use to others whose special provinces are the study of naval architecture, meteorology, or other science. In like manner, he had better leave it to the professor of magnetical science to develope the causes of local attraction, and himself turn his attention to getting a good, steady compass, placing it in that part of his ship where he finds it has least error, and where it is also convenient for taking bearings by it, and then constantly watch it, note its errors, and allow for them.

If it is not a thorough knowledge of the subject that is aimed at by the course of examination mentioned above, but only that the candidate should be acquainted with the rudimentary principles, and be expected to follow up the study of it afterwards, I fear that the possession of such a modicum of science may prove to be

a positive evil. Instead of using the means at the disposal of any navigator, and which are sufficient for the most correct navigation, we should have men tinkering with their compasses and magnets, in attempts to make the needle point in the right direction, where the mere noting of the deviation of it frequently and accurately, is all that is necessary to serve his purpose, and this may possibly be neglected.

It has always been a marvel to me how any master of a vessel could go on from day to day resting in blind confidence on the correctness of his compass, whilst having at hand the simplest means of making sure of the correctness of the course he was steering. As soon would I trust implicitly to dead reckoning, and neglect the use of ordinary observations to ascertain my position.

I find I have spun out this letter much longer than I intended, as my only object when I commenced it was to again draw attention to a subject which all must allow is of grave importance. I must leave it to others to carry it further.

16th July, 1879. W. P.

[We are always glad to receive letters from our esteemed correspondent W. P., but we do not always find ourselves able to agree with him. We fully acknowledge the utility of calling attention to sources of danger to navigation, and are ever ready to lend our pages for this purpose. In the present case we entirely fail to see that a correct knowledge of the causes and effects of deviation can be anything but an immense advantage to a shipmaster, in connection with the working and adjustment of his compasses, and we hope shortly to express our views more fully on this point, but in the meantime are desirous that our readers should not think we endorse the opinions of W. P. in their entirety—Ed.]

THE "PRINCESS ALICE" AND THE "BYWELL CASTLE."

"Sir,—The Court of Appeal has, as I suppose it must have done, reversed the decision of the Admiralty Court, which found the *Bywell Castle* a contributing party to the collision. But it has taken a most important step which I did not expect. It has distinctly condemned the movement of the *Bywell Castle*, while excusing the blunder under the special circumstances of the case.

The *Bywell Castle* turned to the right on receiving a signal that her opponent, ahead and to the left, was turning to the left. This was always a movement demonstrably wrong, and a direct disobedience to the signal, but I believe it has never before been so pronounced by authority. I have worked very hard to get it so pronounced, but without success until now, even before the recent Thames Traffic Committee. The movement is an ordinary precursor of collision, but seamen generally are not in the least aware of the fact, or of its danger, and the Board of Trade has largely circulated instructions which encourage it. There is better reason than any mere opinion of nautical men for believing that had the *Bywell Castle* made the opposite movement, which was dictated by the signal she received, the collision would have been avoided. I trust my brother seamen will take note of this decision, which enables them to do, legally at least, the best that can be done under like circumstances with the *Bywell Castle*.—Yours obediently, P. H. Colomb, Harrow, July 16th."

[The above letter was addressed to the *Times*. As we are quite unable as yet to discover its bearings, we shall be obliged to any of our contributors who will send us a communication not exceeding two pages in length on the following points: (1.) The assertion that sailors are not in the least aware of the danger of turning to the right when an opponent ahead, and to the left is turning to the (we presume "his, the opponent's") left. (2.) That seamen are not in the least aware that such a movement is an ordinary precursor of collision. (3.) What circulated instructions "encourage" (A.), one of two steamers, to port her helm, on seeing the green light of (B.), an opposing steamer, a little on her own (A.'s own) port bow; especially when A. knows by signal that the other steamer B. is at the same time starboarding? (4.) Whether any mercantile sailor imagines that, so far as the rules are concerned, the *Bywell Castle* was not just as free to starboard as she was to port, at the moment she did port? (5.) What signal did the *Bywell Castle* receive? (6.) Whether it is not well understood by mercantile sailors that a wrong movement on the part of A. in the agonies of a collision brought about through a disregard of the rules by B. does *not* render A. liable?—Ed.]

SEAMEN'S DISCHARGES OR CHARACTERS.

To the Editor of the "Nautical Magazine."

DEAR SIR,—The following facts having come before my notice, I wish to ask you what are the powers conferred on a master under such circumstances.

The facts are these—

A vessel being wrecked in a foreign port, and condemned by a competent survey, the crew are ordered to be discharged; but on account of certain circumstances, with regard to the wreckage of the said vessel, proceedings are taken against certain members of crew before a naval court, which result in the honourable acquittal of those members.

Previous to the wreck those members held the best of characters both for ability and conduct, but on their discharge, which did not take place until after their having stood their trial, they were refused characters, no reason being given, but that the instructions from the owners were to that effect.

First I would ask, Is a master compelled to give either good or very good character to a seaman at the time of discharging him, if there is no entry in the official log against him, or can he decline to report on his character, although he is, in every respect, deserving of V.G.?

Does "Decline to report" mean that the master simply refuses to give a character, or does it mean that the character of the recipient is indifferent?

Is the master liable to an action at law for defamation of character by withholding any man's character, although he has no entries in the official log against him?

Why is it necessary for any candidate for a certificate to produce a written certificate of his sobriety before he can get his papers accepted by the examiner, leaving him entirely at the mercy of the master, who may (for private reasons) refuse to give it, although the candidate is a perfectly sober man?

The reason of these questions is simply this—Every candidate for a certificate is compelled by the Board of Trade examiner to produce, at least, good discharges, if not very good; also a written certificate from the master, to the effect that he is a per-

fectly sober man, before his papers will be accepted, a discharge with "Decline to report" not being accepted; and I wish to know if the master, by simply holding his tongue on the subject of a man's character, has it in his power to retard the advancement of any man serving under him, although he knows that he is a thorough seaman and an obedient and sober man.

As this matter is of vital importance to all men who hope to hold a certificate, I beg that you will publish this and also your answer.

I am, dear Sir, your obedient servant,

June 15th, 1879. A SEAMAN.

[Under Section 176 of the Merchant Shipping Act, 1854, upon every discharge effected before a shipping master, the master is required to make and sign, in a form sanctioned by the Board of Trade, a report of the conduct, character, and qualifications of the persons discharged, or may state in a column left for that purpose, in the said form, that "he declines to give any opinion upon such particulars, or upon any of them."

This provision refers to discharges made in the United Kingdom. Section 205 of the same Act, refers to discharges in foreign ports. Under this section, on the discharge of a seaman the master must give him "a certificate of discharge in the form sanctioned by the Board of Trade as aforesaid."

Nothing is said about a character; and it is open to question whether the form sanctioned by the Board of Trade "as aforesaid," refers to the form named in Section 176, which provides for giving or declining to give a character.

The certificate usually given abroad is Form C. 11, and it does not contain a column in which to insert a statement of character. The form, Dis. 1, which is issued under Section 176, does contain such columns, but whether Dis. 1 ought to be given abroad as well as in the United Kingdom is a question which, so far as we are aware, has never been authoritatively decided.

We are not aware of any law which obliges a man to give a character to his servant, and we believe no action lies against a person who declines to do so.

The question raised in our correspondent's letter goes beyond

B 2

the mere refusal of a character if it should be found that the refusal is by common acceptation and practice among seamen and masters equivalent to giving a "bad" character, as will be seen further on. Under Section 134 of the Merchant Shipping Act, 1854, and under Section 8 of the Merchant Shipping Act Amendment Act, 1862, the Board of Trade is required to deliver to every applicant who is duly reported by the local examiners to have passed an examination satisfactorily, and "to have given satisfactory evidence of his sobriety, experience, ability, and general good conduct" on board ship, a certificate of the grade for which he has passed. The Board of Trade is of course bound to obtain from candidates certificates testifying to their good characters in the above respects, and if a candidate is unable to produce such certificates, the Board of Trade must, as that Board has no alternative, refuse to grant him a certificate of competency.

If he, being of a good character, cannot induce the master under whom he has served to give him a character at all, we question very much whether an action at common law and outside the statute altogether would not lie, seeing that for the particular profession of a seaman the certificate of character is necessary to his advancement, and that in the case of a deserving seaman, who wishes to become an officer, he is prejudiced to the extent of not being able to get an officer's certificate, by the character, to which his good conduct entitles him, being withheld.—Ed.]

WEATHER FORECAST FOR AUGUST, 1879.

The Currents or Tendency of the Air over the British Islands for the Month of August, 1879.

Date.	Duration.	Force from		General Direction from	Duration.	Force from		General Direction from
		N. or S.	E. or W.			N. or S.	E. or W.	
Aug.								
1	4 h.m. to 1 h.a.	5½	10	E.S.E.	1 h.a. to 5 h. fol. m.	2	5	W.N.W.
2	5 m. „ 2 a.	8½	7	S.E.	2 a. „ 7 „	4	3	N.W.
3	7 m. „ 2 a.	10	5	S.S.E.	2 a. „ 8 „	5	2	N.N.W.
4	8 m. „ 2 a.	11	4	S.S.W.	2 a. „ 9 „	5	2	„
*5	9 m. „ 3 a.	11½	3	„	3 a. „ 9 „	5	1	„
6	9 m. „ 4 a.	11	4	„	4 a. „ 10 „	5	2	„
7	10 m. „ 5 a.	10½	4	„	5 a. „ 10 „	5	2	„
8	10 m. „ 6 a.	10	5	„	6 a. „ 10 „	5	2	N.N.E.
9	10 m. „ 7 a.	8½	6	S.W.	7 a. „ 10 „	4	3	N.E.
*10	10 m. „ 9 a.	7	7	„	9 a. „ 10 „	3	3	„
11	10 m. „ 10 a.	5	9	W.S.W.	10 a. „ 10 „	2	4	E.N.E.
12	10 m. „ midnight	2½	11	„	... ...	...	...	...
13	2 a. „ 0 fol. m.	0½	13	W. by N.	0 m. „ 2 a.	1	5	E.N.E.
14	2 a. „ 0 „	2½	11	W.N.W.	0 m. „ 2 a.	0	6	E. by S.
15	1 a. „ 2 „	5½	9	„	0 m. „ 1 a.	1	5	E.S.E.
16	1 a. „ 4 „	8	7	N.W.	2 m. „ 1 a.	2	4	„
17	1 a. „ 6 „	10	6	„	4 m. „ 1 a.	4	3	S.E.
18	1 a. „ 7 „	11½	4	N.N.W.	6 m. „ 1 a.	5	3	„
*19	1 a. „ 8 „	12	4	„	7 m. „ 1 a.	5	4	S.S.W.
20	1 a. „ 10 „	13½	3	„	8 m. „ 1 a.	6	2	„
21	2 a. „ 10 „	12½	5	N.N.E.	10 m. „ 2 a.	6	1	„
22	4 a. „ 11 „	11	6	„	10 m. „ 4 a.	6	2	„
*23	6 a. „ 11 „	9	8	N.E.	11 m. „ 6 a.	5	3	„
24	9 a. „ 11 „	6	10	E.N.E.	11 m. „ 9 a.	4	4	S.W.
25	11 a. „ 10 „	2½	13	„	11 m. „ 11 a.	3	5	W.S.W.
26	9 a. „ 2 fol. a.	1	14	E. by S.	10 m. „ 10 a.	1	6	„
27	... ...	...	...	...	2 a. „ midnight	0	7	W. by N.
28	0 m. „ 1 a.	4½	11	E.S.E.	1 a. „ 2 fol. m.	2	5	W.N.W.
29	2 m. „ noon	7	8	S.E.	Noon „ 4 „	3	4	N.W.
30	4 m. „ „	9½	6	S.S.E.	„ „ 5 „	4	3	N.N.W.
31	5 m. „ „	10½	5	S.S.W.	„ „ 6 „	5	2	„

Note.—General direction of Tendency due to Sun from N.W. to N.N.W. causing winds from N.W. to N.E. with a rising, and from S.W. to N.W. with a falling barometer.

Daily change about 3 a.

Moon's maximum N. declination on the 12th = 26° 3′ decrease 2′

„ „ S. „ „ 25th = 26° „ 5′

*** Retrograde movements.**

REMARKS.

1. The Table indicates, taking into account the Sun's tendency from N.W.—

		Probable Winds. In the North.	Probable Winds. In the South.
Strong S. Easterly tendency and strong N. Westerly tendency from the	1st to the 3rd,	Bar. rising. N. Wly. to N. Ely.	Bar. falling. S. Wly. to N. Wly.
Strong S. Westerly „ and „ N. Westerly „	4th „ 7th,	Bar. falling. N. Ely. to S. Ely.	Bar. rising. S. Ely. to S. Wly.
„ S. Westerly „	8th „ 12th,	Rising. S. Ely.	Rising. S. Wly.
„ N. Westerly „	13th „ 20th,	Rising. N. Wly. to N. Ely.	Falling. S. Wly. to N. Wly.
„ N. Easterly „	21st „ 25th,	Variable.	
„ S. Easterly „ and „ N. Westerly „	26th „ 30th,	Bar. falling. S. Wly. to N. Wly.	Bar. rising. N. Wly. to N. Ely.

Dates on which gales may occur—4th, 5th, 10th, 21st to 24th, and 28th to 31st.

2. Moon coming North 1st to the 12th.
„ going South, 13th „ 25th.
„ coming North, 26th „ 31st.

3. Change from the Easterly to the Westerly tendency about the 4th.
„ „ Westerly „ Easterly „ „ 21st.
„ „ Easterly „ Westerly „ „ 31st.
A minor change takes place about the 8th and 19th.

4. It may be observed that the force from the north has slightly increased, and that the rotary velocity is somewhat less. The diminution of 2′ in the moon's maximum N. declination will probably be felt from the retrograde movement on the 10th to the 23rd, or during the Nly. tendency —the decrease of 5′ from the 23rd till the next retrograde movement in September, or during the Sly. tendency. On the whole the conditions seem to point to improved weather during August, with a high temperature.

D. D.

TIDE TABLES FOR AUGUST, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-Super-Mare. A.M.	Weston-Super-Mare. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
F	1	0 45	1 13	5 23	5 49	2 22	2 47	1 17	1 44	4 37	5 8	10 10	10 36	5 51	6 18
S	2	1 40	2 4	6 14	6 38	3 9	3 31	2 7	2 30	5 27	5 51	11 1	11 25	6 43	7 7
S	3	2 26	2 47	7 1	7 22	3 53	4 18	2 51	3 9	6 14	6 33	11 47	—	7 27	7 46
M	4	3 7	3 25	7 41	7 59	4 32	4 51	3 27	3 45	6 51	7 9	0 8	0 28	8 4	8 22
Tu	5	3 44	4 3	8 16	8 33	5 9	5 27	4 3	4 21	7 25	7 41	0 47	1 6	8 38	8 54
W	6	4 21	4 37	8 50	9 7	5 45	6 3	4 39	4 57	7 57	8 13	1 24	1 42	9 10	9 25
Th	7	4 54	5 10	9 24	9 41	6 20	6 37	5 14	5 31	8 27	8 41	2 0	2 17	9 40	9 54
F	8	5 26	5 42	9 58	10 15	6 54	7 11	5 49	6 8	8 55	9 9	2 34	2 51	10 8	10 22
S	9	5 59	6 18	10 33	10 54	7 31	7 53	6 28	6 49	9 23	9 40	3 8	3 26	10 36	10 52
S	10	6 36	6 58	11 19	11 47	8 17	8 44	7 11	7 37	9 59	10 22	3 45	4 7	11 12	11 36
M	11	7 21	7 49	—	0 17	9 14	9 49	8 7	8 42	10 46	11 16	4 29	4 56	—	0 5
Tu	12	8 20	8 58	0 50	1 26	10 28	11 10	9 22	10 4	11 53	—	5 29	6 8	0 42	1 25
W	13	9 45	10 28	2 6	2 44	11 51	—	10 44	11 21	0 37	1 20	6 48	7 28	2 8	2 50
Th	14	11 8	11 46	3 22	3 58	0 28	1 2	11 55	—	2 2	2 43	8 8	8 41	3 31	4 9
F	15	—	0 18	4 29	4 54	1 31	1 56	0 25	0 52	3 22	3 54	9 9	9 33	4 43	5 10
S	16	0 44	1 7	5 17	5 38	2 17	2 37	1 13	1 32	4 21	4 45	9 56	10 17	5 36	5 59
S	17	1 29	1 49	5 58	6 18	2 56	3 14	1 51	2 10	5 7	5 29	10 38	10 59	6 21	6 43
M	18	2 9	2 27	6 38	6 57	3 32	3 50	2 29	2 47	5 50	6 10	11 20	11 41	7 3	7 23
Tu	19	2 45	3 3	7 16	7 35	4 8	4 26	3 5	3 22	6 29	6 48	—	0 2	7 41	7 59
W	20	3 21	3 39	7 54	8 12	4 45	5 4	3 40	3 59	7 7	7 25	0 22	0 42	8 17	8 35
Th	21	3 58	4 18	8 30	8 50	5 24	5 44	4 18	4 38	7 43	8 2	1 3	1 24	8 53	9 11
F	22	4 37	4 56	9 10	9 31	6 5	6 26	4 59	5 20	8 21	8 40	1 45	2 6	9 29	9 47
S	23	5 15	5 36	9 52	10 14	6 47	7 9	5 42	6 6	8 59	9 19	2 27	2 49	10 6	10 25
S	24	5 58	6 23	10 38	11 7	7 35	8 5	6 32	7 0	9 42	10 6	3 12	3 36	10 45	11 8
M	25	6 50	7 19	11 41	—	8 38	9 15	7 32	8 9	10 31	11 0	4 3	4 32	11 38	—
Tu	26	7 52	8 30	0 19	1 0	10 0	10 40	8 53	9 40	11 38	—	5 6	5 45	0 16	1 6
W	27	9 17	10 9	1 42	2 26	11 32	—	10 25	11 9	0 21	1 12	6 29	7 17	1 49	2 38
Th	28	10 54	11 30	3 10	3 50	0 17	0 55	11 48	—	1 58	2 42	8 1	8 36	3 24	4 5
F	29	—	0 11	4 24	4 53	1 25	1 52	0 19	0 46	3 23	3 57	9 7	9 34	4 41	5 12
S	30	0 40	1 [illegible]	5 17	5 39	2 16	2 38	1 11	1 34	4 26	4 48	9 58	10 21	5 39	6 3
S	31	1 28	1 50	6 0	6 21	2 58	3 15	1 55	2 13	5 10	5 31	10 42	11 2	6 25	6 44

Week Day.	Month Day.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	London Derry. A.M.	London Derry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
F	1	10 23	10 47	11 7	11 33	4 1	4 26	10 17	10 38	7 5	7 30	2 49	3 12
S	2	11 10	11 33	11 57	—	4 50	5 13	10 59	11 20	7 53	8 14	3 35	3 57
S	3	11 53	—	0 21	0 42	5 34	5 54	11 40	mid.	8 32	8 49	4 17	4 37
M	4	0 12	0 31	1 1	1 20	6 12	6 30	—	0 19	9 6	9 23	4 55	5 12
Tu	5	0 49	1 6	1 37	1 54	6 47	7 4	0 37	0 55	9 39	9 55	5 29	5 46
W	6	1 22	1 38	2 11	2 28	7 21	7 38	1 13	1 31	10 11	10 27	6 2	6 18
Th	7	1 54	2 11	2 45	3 1	7 55	8 10	1 49	2 6	10 44	11 2	6 35	6 52
F	8	2 28	2 45	3 17	3 33	8 25	8 40	2 23	2 41	11 22	11 46	7 9	7 27
S	9	3 2	3 20	3 50	4 9	8 58	9 17	3 0	3 20	—	0 12	7 46	8 6
S	10	3 40	4 4	4 28	4 51	9 37	10 0	3 42	4 9	0 40	1 13	8 30	8 56
M	11	4 31	5 5	5 16	5 46	10 30	11 8	4 37	5 9	1 48	2 26	9 26	10 8
Tu	12	5 46	6 34	6 23	7 5	11 51	—	5 46	6 26	3 5	3 44	10 48	11 34
W	13	7 17	7 56	7 47	8 28	0 33	1 14	7 5	7 42	4 21	4 53	—	0 16
Th	14	8 32	9 8	9 5	9 38	1 54	2 29	8 18	8 50	5 21	5 47	0 53	1 25
F	15	9 30	9 51	10 7	10 31	2 59	3 24	9 20	9 44	6 10	6 31	1 54	2 16
S	16	10 11	10 29	10 53	11 15	3 46	4 7	10 6	10 24	6 52	7 12	2 37	2 56
S	17	10 49	11 9	11 36	11 57	4 28	4 49	10 42	11 0	7 32	7 53	3 15	3 34
M	18	11 29	11 48	—	0 17	5 9	5 29	11 18	11 36	8 11	8 28	3 53	4 12
Tu	19	—	0 7	0 36	0 55	5 48	6 6	11 54	—	8 44	9 1	4 31	4 49
W	20	0 25	0 44	1 14	1 33	6 25	6 44	0 13	0 32	9 18	9 36	5 8	5 26
Th	21	1 3	1 22	1 52	2 11	7 4	7 21	0 52	1 13	9 54	10 13	5 41	6 4
F	22	1 41	2 1	2 31	2 51	7 44	8 4	1 31	1 55	10 34	10 55	6 25	6 46
S	23	2 22	2 43	3 11	3 31	8 24	8 44	2 16	2 39	11 20	11 50	7 8	7 31
S	24	3 5	3 30	3 54	4 19	9 8	9 33	3 4	3 32	—	0 25	7 57	8 25
M	25	3 58	4 34	4 46	5 18	10 3	10 41	4 2	4 39	1 4	1 49	8 58	9 37
Tu	26	5 17	6 6	5 56	6 41	11 26	—	5 20	6 3	2 38	3 22	10 24	11 14
W	27	6 58	7 45	7 28	8 16	0 14	1 2	6 46	7 31	4 4	4 43	—	0 4
Th	28	8 25	8 58	8 58	9 31	1 46	2 24	8 11	8 45	5 14	5 40	0 46	1 20
F	29	9 26	9 50	10 5	10 31	2 57	3 25	9 18	9 45	6 6	6 31	1 50	2 16
S	30	10 12	10 37	10 55	11 18	3 49	4 12	10 7	10 26	6 54	7 16	2 38	2 59
S	31	10 52	11 10	11 39	11 58	4 32	4 50	10 43	11 0	7 36	7 54	3 18	3 36

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.	Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith	Jersey (St. Helier)	+2 33	Brest
Aberystwyth	−3 52	Liverpool	Kinsale	−0 18	Queenstown
Alderney	+2 59	Brest	Lerwick (Shetland)	−3 47	Leith
Antwerp	+5 13	Dover	Limerick	+1 15	Queenstown
Arbroath	−0 42	Leith	Lisbon bar	−1 17	Brest
Arcachon	+0 50	Brest	Littlehampton	+0 24	Dover
Arklow	−2 25	Kingstown	Llanelly bar	−0 38	Weston-s.-Mare
Ayr	−0 18	Greenock	Lowestoft	−4 1	London
Banff	−1 49	Leith	Lynn & Boston Deep	−0 29	Hull
Bantry harbour	−1 14	Queenstown	Margate	−2 18	London
Barnstaple bridge	−0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
Bayonne	−0 2	Brest	Milford Haven entr.	−0 58	Weston-s.-Mare
Beachy head & Rye bay	+0 8	Dover	Montrose	−0 52	Leith
Beaumaris	−0 51	Liverpool	Morlaix	+1 6	Brest
Belfast	+2 42	Londonderry	Needles point	−1 26	Dover
Berwick	−1 5	N. Shields	Newcastle	+0 23	N. Shields
Blyth	−0 8	N. Shields	Newhaven	+0 39	Dover
Bordeaux	+3 3	Brest	Newport	+0 16	Weston-s.-Mare
Boulogne	+0 18	Dover	Nienport	+1 6	Dover
Bridport	+0 22	Devonport	Nore	−1 28	London
Bristol & King Road	+0 19	Weston-s.-Mare	Orfordness	−2 43	London
Cadiz	−2 2	Brest	Oporto	−1 17	Brest
Caernarvon	−1 56	Liverpool	Ostende	+1 13	Dover
Calais	+0 37	Dover	Padstow	−1 41	Weston-s.-Mare
Campbellton	−0 23	Greenock	Peel, Isle of Man	−0 15	Liverpool
Cardiff	+0 2	Weston-s.-Mare	Pembroke Dock	−0 42	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool	Penzance	−1 18	Devonport
Carlingford bar	−0 10	Kingstown	Peterhead	−1 43	Leith
Chatham	−0 47	London	Piel harbour, Barrow	−0 18	Liverpool
Cherbourg	+4 2	Brest	Plymouth breakwater	−0 6	Devonport
Coleraine	−1 37	Londonderry	Poole	−2 2	Dover
Coquet Road	−0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Cordouan Tower	−0 10	Brest	Portland breakwater	+1 18	Devonport
Cowes (West)	−0 27	Dover	Port Patrick	−0 58	Greenock
Crinan	+4 41	Greenock	Portsmouth	+0 29	Dover
Cromarty	−2 21	Leith	Ramsgate	−2 19	London
Dartmouth	+0 33	Devonport	Rotterdam	+4 33	Dover
Deal & Downs	+0 3	Dover	Santander	−0 17	Brest
Dieppe	+7 19	Brest	Scarborough	+0 48	N. Shields
Donaghadee	+0 3	Kingstown	Selsea bill	+0 33	Dover
Donegal harbour	+0 17	Queenstown	Sheerness	−1 21	London
Douglas & Ramsay	−0 11	Liverpool	Shoreham	+0 22	Dover
Dublin bar	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
Dundalk	−0 16	Kingstown	Southampton	−0 42	Dover
Dungeness	−0 27	Dover	Spurn point	−1 3	Hull
Dunkerque	+0 56	Dover	St. Ives	−2 10	Weston-s.-Mare
Exmouth	+0 38	Devonport	St. Malo	+2 18	Brest
Falmouth	−0 46	Devonport	St. Mary (Scilly)	−1 16	Devonport
Fecamp	+6 57	Brest	St. Nazaire	−0 7	Brest
Ferrol	−0 47	Brest	Stornoway	+6 38	Greenock
Flamborough head	−1 59	Hull	Stromness (Orkneys)	−5 17	Leith
Fleetwood	−0 12	Liverpool	Sunderland	−0 1	N. Shields
Folkestone	−0 5	Dover	Swansea bay	−0 53	Weston-s.-Mare
Fowey	−0 29	Devonport	Tay bar	−0 11	Leith
Flushing	+1 42	Dover	Tees bar	+0 22	N. Shields
Galway bay	−0 26	Queenstown	Tenby	−1 12	Weston-s.-Mare
Gibraltar	−1 27	Brest	Thurso	−5 49	Leith
Glasgow (Port)	+0 10	Greenock	Torbay	+0 17	Devonport
Gloucester	+2 51	Weston-s.-Mare	Tralee bay	−0 58	Queenstown
Granville	+2 26	Brest	Ushant (Ouessant)	−0 15	Brest
Gravesend	−0 48	London	Valentia harbour	−1 19	Queenstown
Grimsby (Great)	−0 53	Hull	Waterford	+0 19	Queenstown
Guernsey (St. Peter)	+2 50	Brest	Westport	−0 4	Queenstown
Hartlepool	+0 5	N. Shields	Wexford	+2 20	Queenstown
Harwich	−1 52	London	Whitby	+0 22	N. Shields
Havre	+6 4	Brest	Whitehaven	−0 9	Liverpool
Helgoland	+0 21	Dover	Wick	−2 55	Leith
Holyhead	−1 12	Liverpool	Wicklow	−0 41	Kingstown
Holy Island harbour	−0 53	N. Shields	Workington	−0 19	Liverpool
Honfleur	+5 42	Brest	Yarmouth road	−4 43	London
Inverness	−1 59	Leith	Youghall	+0 13	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
211	England—South Coast—Plymouth Sound	Light on Mount Batten breakwater.
212	„ East Coast—Humber River	Position of Chequers shoal buoy.
213	„ „ Whitby Rock Buoy	Character altered.
214	„ West Coast—Bristol Channel—Lundy Island	Shoal ground discovered.
215	„ „ Bristol Channel—Bull Point, &c.	New light and change in old one.
216	Scotland—East Coast—Peterhead	South harbour opened and light re-exhibited.
217	Ireland—East Coast—Kish Bank	Masts of H.M.S. *Vanguard* destroyed and light-ship withdrawn.
218	North Sea—Ems River—Borkum Flat Light-vessel	Proposed alteration of fog-signals.
219	„ „ Borkum Island	Visibility of temporary light; intended new light.
220	„ Jade River—Wangeroog	New fog-signal.
221	Gulf of Bothnia—Grundkallen Light-vessel	Alteration of fog-signal.
222	France—West Coast—Belle-Ile—Kerdonis Point	Particulars of light-tower.
223	Spain—North Coast—Bilbao	Telegraph cable.
224	„ West Coast—Vigo Bay	Telegraph cable.
225	Mediterranean — Spain — Iviza Island and Javea	Telegraph cable.
226	„ Sardinia—Cape Ferro	Repairs of light effected.
227	„ Italy—Genoa	Lights to mark extension of break-water.
228	Adriatic—Sinigaglia	Alteration of light on East Mole.
229	Black Sea—Kertch Strait—Cape Yenikali	Range of light.
230	Africa—West Coast—Cape Palmas	Reported dangers.
231	Indian Ocean—Persian Gulf—Oribe Shoal	Sought for, and not found.
232	China Sea—South Part	Reported coral reef.
233	China—Tong-King Gulf—Haïnan Island	Sunken rock off Haïnan head.
234	„ Gulf of Pecheli—Peiho River—Taku Bar	Temporary discontinuance of light.
235	South Australia—Kangaroo Island (Eastern Cove)	Entrance to American river marked.
236	New Zealand—North Island—East Coast	Danger in Poverty bay, and off Portland island.
237	New Caledonia—South Coast—Noumea	New harbour light.
238	South America—Magellan Strait—Sandy Point	Light re-exhibited.
239	West Indies—French Guiana	Particulars of certain lights.
240	United States—Florida—N.W. Passage, near Key West	Light improved.
241	„ N. Carolina—New-Inlet Channel	Buoys removed, and gap in dam filled up.
242	„ „ Albemarle Sound, Edenton	New leading lights.
243	„ Maryland—Havre-de-Grace	Change of colour of light.
244	„ Maine—Cape Neddik	New light.
245	Canada—Nova Scotia—Lunenburg Bay—Cross Island	New fog-signal.
246	„ River St. Lawrence—Pillars Rocks	Algernon rock lighthouse destroyed.
247	„ Gulf of St. Lawrence—Chaleur Bay—Elm Tree Point	New light.
248	„ „ Richibucto River	New leading lights.

NAUTICAL NOTICES.

211.—England.—*South Coast.—Plymouth Sound.—Light on Mount Batten Breakwater.*—A *fixed white* light is now exhibited from the extremity of the breakwater in course of construction at the west end of Mount Batten, entrance to Catwater and Sutton pool.

Note.—The light will be moved outwards as the works progress. It is intended to extend the breakwater from Mount Batten in the direction of the Cobbler buoy, for a distance of 300 yards; the foundation has been laid for 166 yards.

212.—England.—*East Coast.—Humber River Entrance.—Position of Chequer Shoal Buoy.*—This buoy has been replaced in its old position, and now lies in 22 feet at low water spring tides, with the following marks and bearings, viz.:—Easington windmill midway between Easington church and Dimlington cliff, N. ¼ W.; Spurn low lighthouse open westward of the high lighthouse, N.W. ½ N.; Bull light-vessel, N.W. by W. ½ W., distant $8\frac{3}{10}$ths miles. *Variation,* 18¾° *W.*

213.—England.—*East Coast.—Whitby Rock.*—In accordance with previous Notice, the character of the Whitby rock buoy has been altered, and a *bell buoy*, painted *black* and surmounted by a *staff* and *globe*, has been placed in the position heretofore occupied by the black conical buoy.

214. — England. — *West Coast. — Bristol Channel. — Shoal Ground N.E. of Lundy Island.*—Staff-Commander G. Stanley, engaged in sounding the entrance of the Bristol Channel, has discovered a bank N.E.-ward of Lundy island. This shoal ground extends in an E.N.E. and W.S.W. direction about one and one-third mile, with an average breadth of 2 cables; its western extreme bears E. ½ N., 2¼ miles from the north point of Lundy island. On the bank, the general depths are from 6 to 10 fathoms, with, near the middle, two or three shoaler depths of 5 fathoms over sandy bottom; the shoalest spot found—4½ fathoms—bears E. ¾ N., $2\frac{8}{10}$ths miles from the north point of Lundy island. The general depths around the bank are from 11 to 14 fathoms, and westward of it, at the

distance of about 2½ cables, there are two detached patches of 10 fathoms. Position of shoalest spot, lat. 51° 13′ 40″ N., long. 4° 36′ 35″ W.

Note.—The depths given are at low water spring tides. *Variation*, 20½° *W.*

215.—England.—*Bristol Channel.—New Lighthouse on Bull Point, and Improvement of Bideford High Light.*—In accordance with Notice (p. 178), the light on Bull point, on the south side of the Bristol channel, is now exhibited at an elevation of 154 feet above high water. It is a powerful *white triple-flashing half-minute light*, showing *three successive flashes* of about *two seconds'* duration, divided by *eclipses* of about three seconds, the *third flash* being followed by *an eclipse of about* 18 *seconds*. Eighteen feet below this light, a *red fixed* light is exhibited between the bearings of S. 78° W. and N. 62° W., to mark the Morte stone. There is also a powerful *fog-signal* established, which will, in thick and foggy weather, give *three blasts* in quick succession *every two minutes*. Also, the arc of *Bideford high light* is now extended to the northward, and will show between the bearings of S. 68° W. and N. 22° W.; to the eastward of which latter bearing and over Baggy leap and Asp rocks, as far as N. 87° E., it is obscured; from thence round southward to S. 68° W. a light of less power is apparent for the use of harbour navigation. The Bideford low light will remain tidal as heretofore.

216.—Scotland.—*East Coast.— Peterhead.— Re-exhibition of South Harbour Light, and Opening of South Harbour.*—On 12th July, 1879, the light at the entrance of Peterhead South harbour will be re-exhibited. Also, Peterhead South harbour will be opened to shipping, the depth in the basin of the harbour being 6 feet at low water ordinary spring tides.

Note.—The works of excavating and deepening the entrance to the harbour being still in progress, mariners must use the utmost caution in approaching it.

217.—Ireland.— *East Coast.— Withdrawal of Light-Vessel marking wreck of H.M.S. Vanguard off Kish Bank.*—The masts of H.M.S. *Vanguard* having been destroyed sufficiently to prevent obstruction to navigation—there being now a clear depth of 10

fathoms at low water spring tides over all portions of the wreck—the light-vessel that has been employed to mark the wreck will be withdrawn on 1st August, 1879. It is the intention of the Commissioners of Irish Lights, when the light-vessel marking the wreck has been withdrawn, to remove the buoys now indicating the locality. From the wreck, the Kish light-vessel bears N. 24° W., distant $8\frac{3}{10}$ miles; from the wreck, Codling light-vessel bears S. 19¾° W., distant $9\frac{4}{10}$ miles; from the wreck, Bray head bears N. 80° W., distant $10\frac{8}{10}$ miles. These bearings and distances place the wreck in lat. 53° 13′ 10″ N., long. 5° 46′ 40″ W. *Variation*, 22° *W*.

218.—North Sea.—*Ems River.—Borkum Flat Light-Vessel, Intended Alteration in Fog-Signal.*—During the summer of 1879, the signal will be altered to a syren worked by a caloric engine, which during thick and foggy weather will give a blast of *five seconds'* duration *every minute*.

219.—North Sea.—*Ems River.—Visibility of Borkum Island Temporary Light, and Intended New Light.*—With reference to the exhibition of a temporary *fixed* light on Borkum island in consequence of injury to the lighthouse by fire, the light is elevated 118 feet above high water, and should be visible 15½ miles. A new lighthouse is to be erected on Borkum island, in place of the one recently damaged by fire, and about the middle of November, 1879, a light will be exhibited therefrom. It will be a *fixed and flashing* light, showing a flash every *two minutes*, elevated about 200 feet above high water, and visible about 21 miles—at the distance of from 14 to 16 miles a faint continuous light will be seen.

Note.—The old lighthouse will remain as a leading mark and when kept in line with the new lighthouse will indicate a channel of 24 feet at low water.

220.—North Sea.—*Jade River.—Fog-Signal at Wangeroog Island Lighthouse.*—The signal is a syren, which, during thick and foggy weather, gives *two* blasts of about *five* to *six seconds'* duration each, with an interval between them of about *eight seconds*, every *two minutes*. The building in which the syren is placed, bears N.N.W. of the lighthouse, distant 560 yards.

221.—Gulf of Bothnia.—*Grundkallen Light-Vessel.—Alteration*

in Fog-Signal.—The signal is a steam-whistle, which, during thick and foggy weather, will be sounded *three* times *every minute*, as follows :—Sound *seven seconds*, an interval of *three seconds;* sound *seven seconds*, an interval of *three seconds ;* sound *three seconds*, an interval of *thirty-seven seconds.*

222.—FRANCE.—*West Coast.—Belle-Ile.—Light near Kerdonis Point.*—With reference to Notice (p. 543), the lighthouse, 36 feet high, is square, and constructed of stone ; keeper's dwelling detached. Position, lat. 47° 18′ 40″ N., long. 3° 3′ 40″ W.

223.—SPAIN.—*North Coast.—Telegraph Cable at Bilbao.*—Information concerning the telegraph cable laid between Bilbao and England :—At Bilbao the terminus of the cable is on playa de las Arenas (playa de Guecho), close to the telegraph station house ; it is thence laid in a N. by W. ½ W. direction for 2 miles, and after a slight westerly bend, N.W. by W. ½ W. for 7 cables' lengths, and thence passes out of Bilbao bay in a N. by W. ¾ W. direction. Mariners are cautioned not to anchor in the vicinity. *Variation,* 18¼° *W.*

224.—SPAIN.—*West Coast.—Telegraph Cables in Vigo Bay.*—Information concerning the telegraph cables laid between Vigo and England, and between Vigo and Lisbon :—At Vigo the terminus of each cable is at point de la Lage (near St. Andres battery) ; thence they are laid near each other for the distance of 9 miles, until outside the South channel entrance ; from this position the cable to England takes a N.W. by N. ½ N. direction ; and the cable to Lisbon a S.W. by S. direction. Mariners are cautioned not to anchor in the vicinity. *Variation,* 20¼° *W.*

225.—MEDITERRANEAN.—SPAIN.—*Telegraph Cable between Jávea Bay and Iviza Island.*—On the mainland, the cable is landed close to the dockyard in the northern part of Jávea inner harbour, it then takes a southerly direction, skirts closely the southern limit of the anchorage, and crosses thence to Cala Padella (connected by telegraph with Grosa point), Iviza island. Mariners are *cautioned* not to anchor in the vicinity.

226.—MEDITERRANEAN.—SARDINIA.—*Bonifacio Strait.—Cape Ferro.*—With reference to Notice (p. 543), on the temporary alteration in Cape Ferro light, pending repair of the machinery :

the repairs have been effected and the *fixed* and *flashing* light re-exhibited.

227. — MEDITERRANEAN. — *Italy.* — *Extension of Breakwater Works at Genoa.*—The work now extends in a South (*true*) direction from the New or West mole head for a distance of 481 yards, and is marked by the small lighthouse, from which two lights placed vertically are exhibited. The breadth of the upper surface of the masonry is 60 yards; the depth over it for 372 yards from the mole head are from 19½ to 23 feet; and for the outer 109 yards, from 23 to 33 feet; at the extremity the depth is 10⅓ fathoms. Mariners are cautioned not to pass southward of the New mole head at a less distance than 2¾ cables.

228.—ADRIATIC.—*Alterations in Port Sinigaglia Light.*—The following alterations have been made in the light exhibited from the brick tower near the extremity of the East mole, in course of construction at port Sinigaglia:—The light heretofore in use is replaced by a fixed white light, elevated 45 feet above the sea, and visible 11 miles. Position as given, lat. 43° 43′ 0″ N., long. 13° 13′ 40″ E.

Note.—At the outer end of the works extending from the East mole, a fixed *green* light is exhibited.

229.—BLACK SEA.—*Kertch Strait.*—*Cape Yenikali Light, Limits of Visibility.*—From 1st June, 1879, the light would be visible between the bearings of N.E. ½ N. (through west) and S.S.E. *Variation,* 1¼° *W.*

230.—AFRICA.—*West Coast.*—*Dangers near Cape Palmas.*—Information has been received of the recent striking of the British and African Steam Navigation Company's ship *Volta*, on a sunken rock in the neighbourhood of cape Palmas. This danger appears to be small in extent, with depths surrounding it of 6 and 8 fathoms. The position assigned, is cape Palmas lighthouse bearing E. ¼ S., distant 1¼ mile, and the wreck of the ship *Yoruba* (lying on the beach 8 cables N. ½ W. from cape Palmas lighthouse) bearing N.E. by E. ½ E. The steamship *Congo*, in 1875, reported shoal ground of 4¾ fathoms, as lying with cape Palmas lighthouse bearing E. by S. ½ S., and the wreck of the ship *Yoruba* bearing E.N.E. To clear the Volta rock, and the probable foul ground embraced in the

two positions given above, it is recommended that vessels coming from the eastward should not shoal the water less than 14 fathoms, until the lighthouse on cape Palmas bears E.S.E., when the cape may be steered for and anchorage taken up on that bearing. *Variation*, 20° *W*.

231.—INDIAN OCEAN.—*Persian Gulf.—Oribe Shoal.—Unsuccessful Search For.*—With reference to Notice on the reported existence by the master of the British barque *Oribe*, of a sunken danger (Oribe shoal), lying in lat. 27° 27′ N., long. 50° 59′ E.—about midway between Ras-al-Mutaf and Rennie shoal—in the fairway of the Persian gulf:—Oribe shoal was specially searched for during a whole day by H.M.S. *Arab*, in January, 1879, and Commander F. R. Dicken reports having on several occasions obtained soundings of from 30 to 35 fathoms over and around the position given, and that throughout the day the hand lead was kept constantly going. A careful look-out was also kept, but at no time was any indication of shoal water seen either from the masthead or deck. The space examined is included between lat. 27° 24′ and 27° 31′ N., long. 50° 53′ and 51° 3′ E.

232.—CHINA SEA.—*Southern Portion.—Reported Coral Reef.*—This danger (*Mariveles reef*), on which the Spanish steam-vessel *Mariveles* struck at night on the 27th January, 1879, when proceeding from Singapore to Manilla, is composed of coral, and is in places nearly awash. The reef is steep to, 55 fathoms being obtained close to the edge, and it appeared to be about 4 miles long and 2 miles broad, with deep water in the centre. The position given by the commander of the *Mariveles* is, approximately, lat. 7° 58′ N., long. 113° 50′ E. (This would place the reef within the space marked as "dangerous ground" on charts of the China sea.)

233.—CHINA.—*Tong-King Gulf.—Haïnan Island.—Sunken Rock South-East of Haïnan Head.*—This danger (*Magpie rock*), on which the *Magpie* struck in April, 1879, when proceeding from Haïnan strait to Taya islands, is a pinnacle rock, and lies S.E. distant about 2½ miles from Haïnan head, and 1½ mile from the shore.

Note.—The position must be considered approximate, pending further examination. *Variation*, 1½° *E*.

234.—CHINA.—*Gulf of Pecheli.—Peiho River Entrance.—Temporary Discontinuance of Taku Bar Light.*—This light-vessel sank at her moorings, and consequently the light is temporarily discontinued.

235.—SOUTH AUSTRALIA.—*Kangaroo Island* (*Eastern Cove.*)—Masters of coasting vessels and others, who may be desirous of seeking shelter in what is locally known as American river, are informed that the entrance has been marked by a chequered perch buoy, painted black and red, and moored in mid-channel, in 9 feet at low water. Vessels can pass on either side of it. Another chequered perch buoy, similar to the above, has been moored in mid-channel, about half-a-mile to the S.W. of the buoy, marking the entrance. After passing this buoy no difficulty will be experienced in reaching the anchorage off Buick's, the sand banks on either side being well defined.

236.—NEW ZEALAND.—*North Island.—East Coast.—Sunken Danger in Poverty Bay.*—This danger (*Hawea rock*) on which the steam-vessel *Hawea* touched when entering the bay on 12th March, 1879, lies with the following bearings, viz.: Pa hill, N.E. ¼ N.; south extreme of Tua Motu, E. ½ S.

Note.—Pa hill is a conical hill (470 feet high) situated about half-way up the bay on the north side, and these bearings place the danger about 1¼ miles from the north shore of the bay.

Breakers between Portland Island and Bull Rock.—Also, with a high south-easterly sea running, heavy breakers have been observed between Portland island lighthouse and Bull rock, distant about 2¼ miles from the island.

237.—NEW CALEDONIA.—*South Coast.—Harbour Light at Port Noumea.*—A harbour light is exhibited when the moon is not visible, in front of the harbour master's house at port Noumea, New Caledonia. It is a *fixed red* light, visible 6 miles. Position, lat. 22° 16′ 20″ S., long. 166° 27′ 5″ E.

238.—SOUTH AMERICA.—*Magellan Strait.—Broad Reach.—Sandy Point Light Re-exhibited.*—The light, elevated 41 feet above the ground, and 79 feet above the sea, should be visible between the bearings N. by W. ¾ W. (through west) to S. ¾ W., from a distance of 10 miles. *Variation, 21½° E.*

239.—West Indies.—*French Guiana.—Particulars of certain Lights.*—The following particulars have been published concerning certain lights on the coast of French Guiana:—

(1.) *Cayenne.—Enfant Perdu.*—The light (fixed white) exhibited from a framework of wood, should be visible between the bearings S.W. by S. and E. by S. ½ S., also between N.E. by N. and W. by N. ½ N., from a distance of 7 miles. Position, as given, lat. 5° 2′ 40″ N., long. 52° 21′ 20″ W. Also, *Fort Cépérou* (fixed white) should be visible 10 miles. Position, as given, lat. 4° 56′ 20″ N., long. 52° 20′ 10″ W. The light (fixed green) shown from the infantry barracks, bears N.W. by N. of fort Cépérou light, and is obscured westward of the bearing S.W. ½ S.

(2.) *Salut Isles.— Royale Islet.*— The light (fixed white) is elevated 197 feet above high water, and should be visible 13 miles. Position approximate, as given, lat. 5° 16′ 45″ N., long. 52° 35′ 0″ W.

(3.) *Maroni River Entrance.—Les Hattes.*—The light (fixed white) on Françaisе point, east side of the river entrance, is shown from a white pyramid-shaped structure, and should be visible between the bearings E. by N. and W. by S. (through south), from a distance of 10 miles. Also, *Galibi Light* (fixed white) on Kaimar head, west side of the river entrance, is shown from a white pyramid-shaped structure, and should be visible between the bearings S. ¾ E. and W ¾ S., from a distance of 10 miles. *Variation*, ½° *W.*

240.—United States.—*Florida.—Change of order of Northwest Passage Light.*—The light displayed from Northwest Passage lighthouse, near Key West, Florida, has been improved, is *fixed white*, and elevated 48 feet above mean sea-level.

241.—United States.—*North Carolina.—New-Inlet Channel Buoys Removed.*—The gap in the dam at New-Inlet, mouth of Cape Fear river, has been filled, thus closing the whole distance between Zeke's island and Federal point; and the buoys marking the channel of New-Inlet will be removed.

242.—United States.—*North Carolina.—Edenton Bay.—Albemarle Sound.—Range Beacons at Edenton.*—Two range or leading lights mark the channel into Edenton harbour, as recently excavated.

Both beacons show a *fixed red* light from ship-lanterns. The front light is placed on a pole at the end of the county wharf, at Edenton, 8 feet above mean tide. The rear light is 400 feet to northward, in a tree, and 30 feet above mean tide.

243.—UNITED STATES.—*Maryland.—Change of Colour of Light at Havre-de-Grace.*—This light at the mouth of the Susquehanna river, head of Chesapeake bay, now shows as a *fixed red* instead of a white light.

244.—UNITED STATES.—*Maine.—Light on York Nubble, Cape Neddik.*—It is a *fixed red* light, elevated 92 feet, and visible 15 miles over an arc of 300°. The tower is of iron, conical, and painted red. The keeper's dwelling close by is white. A fog-bell will give two strokes and one stroke, alternately, every 30 seconds. Position given, lat. 43° 9′ 45″ N., long. 70° 35′ 30″ W.

245.—CANADA.—*Nova Scotia.—South-east Coast.—Lunenburg Bay.—Fog-Signal near Cross Island Lighthouse.*—The signal is a steam-horn, which during thick weather, fogs, and snowstorms, will sound a blast of *ten seconds'* duration, every *minute and a-half;* the interval between the blasts being *eighty seconds.*

246.—CANADA.—*River St. Lawrence.—Pillars Rocks.—Temporary Discontinuance of Algernon Rock Light.*—In consequence of the destruction by fire of the auxiliary tower on Pillars rocks, the light shown from Algernon rock is temporarily discontinued.

247.—CANADA.—*Gulf of St. Lawrence.—Chauleur Bay.—Light on Elm Tree Point.*—Exhibited from a lighthouse (named Petit Rocher), recently erected on Elm Tree point, west side of Nipisighit bay. It is a *fixed white* light, elevated 36 feet above high water, and visible between the bearings of N.N.E. and S. by E., from a distance of 12 miles. The lighthouse, 31 feet high, is square, constructed of wood, and painted white. Position, lat. 47° 48′ 40″ N., long. 65° 43′ 15″ W. *Variation,* 23¾° *W.*

248.—CANADA.—*Gulf of St. Lawrence.—Chaleur Bay.—Leading Lights at Richibucto River Entrance.*—Two leading lights are now exhibited from lighthouses recently erected near the day beacons on South beach, Richibucto river entrance :—The *Low Light* is *fixed white,* elevated 40 feet above high water, and visible 12 miles.

The lighthouse, 33 feet high, square, constructed of wood, and painted white, with dwelling attached, is situated on the outside of the river bank. Position, lat. 46° 42′ 45″ N., long. 64° 46′ 10″ W. The *High Light* is *fixed red*, elevated 44 feet above high water, and visible 12 miles; it bears W. by S. ½ S. from the low light, distant 102 yards. The lighthouse, 43 feet high, is an open frame square tower, painted white.

Note.—These lights kept in line bearing W. by S. ½ S., lead through the channel over the bar at the river entrance, and are intended to replace the day beacons. *Variation,* 22¾° *W.*

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, 1879.

No. 12.—AFRICA PILOT, Part III.; remarks relating to the coast between Tugela river and St. Lucia bay.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, IN MAY AND JUNE, 1879.

		s.	*d.*
1587	Adriatic:—Valona bay	1	0
410	Cuba:—Càrdenas and Sta Clara bays, and port Cabanas	1	6
1561	Adriatic:—Ports, Lussin Piccolo, Cherso, Veglia, Segna or Zengg, Arbe, Kruel, Berguglie, Lungo, Manzo, and S. Pietro Di Nembo	1	6
2323	North America, west coast:—Manzanilla bay to the gulf of California, including the Revilla Gigedo islands	2	6
2324	North America, west coast:—Cape San Lucas to San Diego bay, with the gulf of California ...	2	6
1581	Adriatic:—Approaches to port Sebenico, with Morter bay	1	0
718	Islands off north coast of Madagascar:—Aldabra, Assumption, Cosmoledo group, Farquhar group with entrance to Inner harbour	1	6
233	Egypt:—Suez canal	2	6

2887 An enlarged plan of Mare island strait added.
2416 Plan of Kerama channel and anchorages added.
2259 Plan of Ceniza mouth of the Rio Magdalena added.
1908 Plan of San Juan anchorage cancelled and plan of Asuncion passage added.
587 Slip, and plan of Maldonado and adjacent shoals added 2 0
1876 Plans of Chamatla river, ports Sihuatanejo and San Blas, transferred to this sheet from No. 588.
BOOK.—Admiralty catalogue of charts, plans, and sailing directions, 1879 ... ... 11 0

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

2404. Charles W. Cooper, New York, U.S.A. "Improvements in automatic governors for marine engines." (A communication.)

2448. James Wavish, Leytonstone, Essex. "Improvements in or applicable to locomotive, marine and other steam boilers, for the purpose of promoting the combustion of fuel and obtaining increased evaporating power."

2472. John Y. Buchanan, Edinburgh. "Improved apparatus to be used for sounding or ascertaining the depth of water."

2504. James Clayton, Liverpool. "Improvements in buoys or life and property saving apparatus for sea use."

2505. Governaur Hamilton Griffin, Liverpool. "Improvements in waterproof garments or head and body coverings for drivers and others exposed to the weather."

2516. Robt. B. Bell, Glasgow, Peter L. Henderson, Fenchurch

Street, London. "Improved mode of working steam-ferry traffic, and of loading and discharging vessels."

2520. William B. Barker, Hoboken, Hudson, U.S.A. "An improved code and apparatus for marine safety signalling, to be called 'Captain Barker's marine safety signal.'"

2607. David Huston, Boston, Massachusetts, U.S.A. "Improvements in and relating to ships' sleeping berths, which improvements are also applicable to other parts of ships and their furniture." (A communication.)

2656. Auguste Blondot and Jules Bourdin, Boulevard Saint Denis, Paris. "Improvements in means and apparatus for immersing submarine telegraphic cables."

2667. Samuel Wilkinson Snowden, Rathgar, Dublin. "Improvements in machinery for propelling vessels."

2705. Stephen Longfellow, Pennsylvania, U.S.A., Master Mariner. "Improvements in and relating to mariners' compasses." (A communication.)

AMERICAN.

213557. George H. Felt, Brooklyn. "Rowing apparatus."

213629. John C. Cottingham, Philadelphia. "Steering gear for vessels."

213652. Merritt A. Hall, Philadelphia. "Chain-propellers for boats."

BELGIAN.

48381. A. P. Passet. "A swimming apparatus."

48418. C. A. MacEvoy. "A torpedo apparatus."

FRENCH.

128301. Corduan. "A process and apparatus for balancing seats and beds, chiefly applicable to ships for preventing sea-sickness.

128312. Courtenay. "Converting tidal water into a continuous hydraulic power to any amount."

128332. Satre. "A dock-boat for transporting other boats."

128369. Bibal, Paris. "A toy-boat with an interior propeller."

128379. Mrs. Fowle. "An anchor."

128443. De Binzer and Bentzen. "A screw-propeller."

GERMAN.

6265. H. Satre, Lyons. "A dock vessel for laded river boats, and for transporting them over shallows."

6444. W. C. Hallett, London. "A construction of screw-propellers."

6568. L. Sontag, Breslau. "Improvements in a pocket compass."

6578. H. A. Severn, London. "Modifications in sea compasses for indicating deviations of vessels from the prescribed course."

6582. J. De Binzer and E. Bentzen, Salzburg. "A screw-propeller."

6583. H. J. Jackson, Deptford. "A construction of screw-propellers."

ITALIAN.

125. J. J. Kunstadter, London. "Apparatus and mountings for steering and propelling, or for facilitating the steering and propulsion of vessels."

165. G. B. Rocca, Genoa. "A screw-propeller, with fixed and moveable wings."

PATENTS PUBLISHED.

1580 (1879). Joseph Warren Fowle, Boston, Mass., U.S.A., Engineer. "Improvements in code of ships' fog-signals, and fog-signal apparatus." This consists in indicating by means of a sounding instrument the course in which a ship is sailing or being propelled. A cylinder is provided with pins or projections on its periphery, which projections are arranged in parallel circles on the cylinder, and upon the cylinder being rotated, act upon a wedge-shaped projection on a shaft, to which is secured the hammer of a gong, and in this manner the gong is struck during the rotation of the toothed cylinder. The teeth in each row upon the cylinder are so arranged as to give regular or interrupted blows to the gong, according to the point of the compass in which the ship is going, thus—a single blow, repeated at constant intervals, would indicate a certain direction; while one blow, a pause and two blows, would indicate another direction. By such a code of signals, vessels passing by each other in foggy weather would not only know by

the sound in what locality each one was, but in what direction each one was sailing, and by this means avoid collision.

4660 (1878). Joseph William Watson, Jarrow, Durham. "Improvements in apparatus or machinery for steering vessels." This consists of a steam cylinder, placed under the bridge, with a crosshead fitted on to the free end of the piston-rod, which crosshead slides to and fro in adjacent bearings. To one end of a shaft, fixed below the bearings, and carrying a double crank, is keyed a double-grooved segmental wheel for the chain that actuates the rudder to work in. A vertical spindle, carried in a deck-bearing, passes up through a dial-plate, placed on the bridge, and is provided with a pointer and hand-lever; by moving which, to point to any one of the words "port," "starboard," or "steady," the rudder is instantly moved into the required position, this being done by means of an eccentric on the lower end of the spindle and connected with the slide valve. The movement of the hand to "port" or "starboard" turns the steam on, and when set to "steady" shuts it off, and the rudder then comes in a line with the keel. A second dial shows automatically the exact position of the rudder, which is kept in any position by a brake. In this way a vessel may be steered from the bridge with the greatest ease, certainty, and rapidity of action.

4729. William Bell, at Messrs. W. Walker & Co.'s, Deptford Green Dockyard, London. "Improvements in the construction of iron or steel vessels." This invention relates to an improved system of longitudinal framing combined with diagonal beams and pillars, constituting an arrangement for the construction of iron or steel vessels, the principle of which is especially applicable to vessels of extreme proportions, and to torpedo boats and river steamers where great lightness is required, as well as for all vessels wherein water-ballast tanks or water-tight partitions have to be fitted; and consists principally in the adoption of longitudinals of iron or steel of a ‾|_ section, which are rivetted along the seams of the overlapped plating. The distance between these longitudinals amidships varies according to the area and shape of the midship section, being greatest in large heavily-plated vessels. To assist the bulkhead in bearing the strain consequent upon this

construction, the beams are fitted diagonally across them. The forward bulkhead is inclined forward, out of the perpendicular, at any angle determined by the fineness of the lines, the whole of the longitudinals terminating against it, and being there tied together horizontally in pairs by a plate. The spaces between the skin and the connecting angle irons of the transverse bulkheads are made watertight by means of chocks of wood or indiarubber, fitted and caulked tight before the cement, which covers them to the height of the bilges, is laid; by this means the necessity of punching holes round the vessel, at right angles to her length, is avoided, which adds considerably to the strength of the shell in a longitudinal direction. The stem and posts are of the usual construction; the beams are carried diagonally from side to side, and fastened together at their intersection, and at their ends are secured to the sheer strake by a flanged plate, forming a knee. Diagonal braces are fitted between the vertical pillars. By this arrangement the ship, as a whole, is converted into an effective girder, able to resist all strains with equal facility in whatever position she may be placed by the action of the waves.

4874. Middleton Pratt, Rood Lane, London. "Improvements in screw-propellers and method of driving." The object of this invention is to apply dual or multiple screw-propellers to vessels in which a new or improved method of driving is adopted, and also the application of dual or multiple balanced screw-propellers under an improved system of mounting and driving to facilitate steerage, propulsion, economy and ease of repair. A dual propeller with blades respectively of right and left-handed pitch is applied to the same central axis; one screw only is fixed to the driving-shaft; the other revolving in an opposite direction is carried by a support in the same axis as the driving shaft, and is driven by a system of three or more bevel wheels, one of which is fixed to the driving shaft of the first-mentioned screw.

OUR OFFICIAL LOG.

Official Inquiries at Home.

306. *Augusta*, s.s.; built at Jarrow-on-Tyne, 1872; owned by Mr. A. M. Cohen and others; tonnage, 567; Glasgow to Venice; coals; stranded on Burial Island, County Devon, May 17, 1879. Inquiry held at Belfast, June 3, 1879, before O'Donnell, Judge, Holt and Castle, N.A. Master to blame in neglecting to use the lead. Severely censured and cautioned to be more careful in future.

307. *Lochearn*, s.s.; built at Dundee, 1878; owned by David Ireland and others of that port; tonnage, 561; Burntisland to Mulgraben; coals; lost on Bornholm Island, April 18, 1879. Inquiry held at Dundee, May 29, 1879, before Edward and Alison, J.P., Aplin and Ward, N.A. Master in default in not using more caution. Certificate suspended for three months.

308. *Whitehaven*, steam-tug; built at Whitehaven, 1875; owned by the Trustees of the Port; tonnage, 85; Liverpool to Bristol Channel; lost on the Horse Rock, Ramsey Sound, May 21, 1879. Inquiry held at Liverpool, June 7, 1879, before Raffles, Stip. Mag., Grant and Wilson, N.A. Vessel lost through careless navigation on the part of the master. Certificate suspended for six months.

312. *Streonshalk*, s.s.; built at Whitby 1878; owned by Turnbull and Sons; tonnage, 1,022; Newport to Savona; coals; damaged by an explosion of gas, April 13, 1879. Inquiry held at Newport, June 4, 1879, before Rothery, Wreck Commissioner, Forster and Sceales, N.A. Explosion due to hatches being battened down and there being no means by which the gas could escape, but Court decided that master committed an error of judgment in not shipping the ventilating cowls, &c. Certificate returned.

Official Inquiries Abroad.

299. *Mangana*, s.s.; stranded on Little Swan Island, October 27, 1878. Inquiry held at Hobart Town, October 31, 1878. Master and mate to blame for allowing for a deviation of compass

which did not exist, and for leaving the deck at a critical time. Second mate also to blame. Certificates suspended for three months in each case.

300. *Josephine*, schooner; wrecked at the entrance of the Clarence river, March 21, 1879. Inquiry held at Sydney, March 31, 1879. Master cautioned to be more careful in future.

301. *Brothers Pride*, barque; abandoned at sea, May 7, 1879. Naval Court held at New York, May 23, 1879. Court found that master might have used more strenuous efforts to reduce the leak. Master severely reprimanded.

302. *Hydrabad*, ship; stranded on Horoahenua Beach, June 24, 1878. Inquiry held at Wellington, New Zealand, March 18, 1879. Accident due to stress of weather, and to the parting of the cables. Master free from blame.

303. *Barrabool*, s.s., and *Bonnie Dundee*, s.s.; in collision off Lake Macquarie, March 10th, 1879. Inquiry held at Sydney, March 28th, 1879. Accident caused by the mate of the *Bonnie Dundee* first porting his helm and then putting it hard-a-starboard, in violation of Steering and Sailing Rules. Certificate suspended for twelve months.

304. *Unity*, ketch; stranded on North Reef, Cape Campbell, March 20, 1878. Inquiry held at Wellington, N.Z., April 4, 1879. Casualty due to an error of judgment in hauling the vessel to the wind too soon. Master recommended for a new certificate in place of that lost.

305. *Taranaki*, s.s.; lost on Karewa Island, November 29, 1878. Inquiry held at Tauranga, N.Z., December 6, 1878. Some little blame attached to master, but in consideration of his good character certificate was returned.

309. *Yesso*, s.s.; lost on the White Rocks, March 17, 1879. Inquiry held at Hong Kong, March 25, 1879. Master guilty of careless navigation. Certificate suspended for three months.

310. *Caldbeck;* stranded at the mouth of the Chittagong River, January 4, 1879, whilst in charge of a pilot. Inquiry held at Chittagong, January 8, 1879. Pilot exonerated from blame.

311. *City of Paris*, s.s.; stranded on the Roman Rocks, Simon's Bay, March 21, 1879. Inquiry held at Simon's Town,

March 25, 1879. Casualty due to an error of judgment on the part of the master, who was severely censured.

313. *Mathilda*, brigantine; stranded when crossing the Bar at Breede River, March 3, 1879. Inquiry held at Cape Town, April 9, 1879. Master free from blame.

314. *Clyde*, s.s.; lost at Dyer's Island, April 8, 1879. Inquiry held at Cape Town, April 16, 1879. Master to blame for disregarding the sailing directions, neglecting to use the lead, and for not making proper allowance for deviation in compass. Certificate suspended for twelve months.

315. *Revival*, brigantine; abandoned at sea, March 25, 1879. Inquiry held at Port Louis, Mauritius, April 8, 1879, when the master was exonerated from blame. Subsequently, however, the vessel was taken safely into Tamatave by crew of the barque *Holland*.

316. *Memphis*, s.s.; stranded on Langvikskar Reef, May 1, 1879. Naval Court held at Stockholm, May 19, 1879. Master guilty of negligence and incompetence. Certificate suspended for two years. Second mate guilty of insubordination. Certificate suspended for three months.

317. *Ganymede*; barque; damaged by fire, April 1st, 1879, at Port Pirie. Inquiry held, April 22, 1879. Accident due to the use of an unprotected light.

318. *Wodonga*, barque; stranded in Spencer Gulf, April 6, 1879. Inquiry held at Port Pirie, April 24, 1879. No evidence adduced on which to found a charge against master.

319. *Thracian*, barque; lost at sea. Inquiry held at Moulmein, May 7, 1879. Loss caused by stress of weather.

320. *Eva Maud*, ketch; lost on the Bar at Brunswick River. Inquiry held at Sydney, April 28, 1879. No blame attached to master.

321. *Ajax*, s.s., and *Duart Bay*, ship; in collision at Newcastle, N.S.W., March 28, 1879. Inquiry held at Newcastle, April 3, 1879. Accident caused by master of *Ajax* proceeding in a dense fog. Severely censured and cautioned to be more careful in future.

322. *Kepler*, s.s.; stranded at the mouth of the Rangoon River,

April 20, 1879. Inquiry held at Rangoon, May 12, 1879. Accident caused by a strong and unusual current setting the vessel on the sands.

323. *Juno*, ketch; foundered off Terrigal, in consequence of striking some wreckage, April 26, 1879. Inquiry held at Sydney, May 5, 1879. No charge of default made against master.

GENERAL.

New Commercial Route to British North America *via* Hudson's Bay.—Colonel Dennis, Surveyor-General of Canada, hopes to be able to establish a route to British North America similar to that which Professor Nordenskiöld has accomplished for Siberia; it is nothing less than to open up, by way of Hudson's Bay, the riches of the Saskatchewan valley to the commercial enterprise of Europe, during the season when there is little or no ice in the bay, which is the case from the beginning or middle of July to the end of September. York Factory, the chief commercial entrepôt on Hudson's Bay, is about the same distance from Liverpool as is New York, and can easily be connected with Prince Albert, on the Saskatchewan river, by means of a tramway or railroad 400 miles in length; the coal for the projected line can be readily procured from Davis Strait, where that useful mineral is abundant, and of good quality. The Saskatchewan district contains a very extensive area of excellent arable land, watered by the Saskatchewan, Beaver, Peace, Athabasca, and numerous other but smaller rivers; and it grows the finest wheat to be found on the American continent, especially in the vicinity of Fort Providence, under the 58th parallel, and the most northern part of the district. The Colonel aims also at developing the rich fisheries of Hudson's Bay and thinks that a lucrative timber trade may be established, as the pine forests around the bay are extensive, and the trees large and sound. If report be true, a vessel has been engaged for the forthcoming season to open the communication between the mother country and her distant northern colony. We wish the Colonel success in his project.

THE

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SHIPPING CASUALTIES INVESTIGATION ACT, 1879.

(LORD SANDON'S ACT.)

It is with a great sense of relief that we find ourselves able to place on record the fact that there has been no Merchant Shipping Bill this year. It has become the fashion for many years past to present to the House of Commons a measure affecting the shipping interests; and when the Government Departments have not always seemed able to conjure up anything new in that way, gentlemen having no responsibility have always been ready to propose a specific of their own for some supposed evil. The magnitude of these latter gratuitous proposals, and the extent to which they would interfere with trade without doing any good, have always been proof of, and in proportion (more or less exact) to the ignorance of their proposer. One of the most difficult of tasks for a competent man to undertake is to attempt to deal with a portion of Mercantile Marine Legislation; it is only in hands quite incompetent, and to minds quite ignorant, that such a task presents no difficulties, and therefore becomes simple.

Apart from the subject of Mercantile Marine Legislation, there was one thing closely related to it which called for attention; and we congratulate our readers that the competent hands of

Viscount Sandon have dealt with it, without giving the incompetent and ignorant any chances of meddling and muddling. Some impassioned appeals and some electioneering speeches have by this been missed out from our national records, but against that loss we have the gain of a good statute dealing with Investigations into Shipping Casualties.

"Where there is smoke there is fire." There has been a great deal of vapouring and smoke lately concerning these investigations; and if there has not been an actual break out of fire in the midst of master mariners there has been a great deal of heat. If, without alluring to them the attention of Viscount Sandon, affairs had been allowed to go on much longer as they were going, we are not prepared to state with certainty that the master mariners of this country would not have spontaneously combusted: and as all know that spontaneous combustion is generally attended with total loss, it would be too lamentable to picture—even as it is too dreadful to conjecture, however vaguely—what would have been the condition of "the profession" had so dire a calamity fallen. As time wore on, however, and heat lessened, that great danger passed over; but premonitory symptoms of explosion showed themselves. This being so, the case was clearly one demanding surface ventilation. Not a fierce blast of air through the bulk, but just a gentle current to play over the surface.

We learn from Captain ——, an active gentleman in "the profession," that a conference took place between certain delegates of the master mariners, and the President of the Board of Trade. Mr. C. M. Norwood, the senior M.P. for Hull, who attended with the delegates (we are judging again from the statement of our active professional friend aforesaid), seems to have behaved with admirable tact; and the means for surface ventilation appear to have been extremely well applied by Viscount Sandon. It is therefore no matter for wonder that the cure was speedy and effectual. One current of the pure air of open explanation and free discussion passed over the surface, and, as if by magic, the accumulated undigested misunderstandings, and other objectionable stuff, were given off, and dissipated into thin air, or thrown to those depths

of oblivion in which the most determined of wreckers or salvors will be unable to reach them.

Whether the master mariners themselves brought about the present Act in its present form, or whether other persons may have had something to do with it, we are unable to say. We are, however, able to say that they seem to be abundantly satisfied and jubilant: and seeing that the master mariners have got their way, we doubt whether anything short of real good honest blundering on their part, or the promulgation of rules inconsistent with the spirit of the Act, can for years stir up anything bearing a complexion of wrong to, or ill usage in connection with, wreck inquiries.

We think the master mariner has been wrong, indeed he has been worse than wrong, he has been foolish, in not either leaving matters as they were under the Merchant Shipping Acts of 1854 and 1862, or while he was about it, in not trying to secure a radical alteration in the constitution of the Tribunal, so that cases should be tried by three sailors as the Court, assisted by a legal assessor. That is what he said he wanted. The system under those Acts has been likened to the reign of King Log when his amphibious subjects prayed Jupiter to give them a government of another sort. From 1876 onwards has been likened to the reign of that King Stork, who superseded King Log, and under whose government the subject was often gobbled up. Whether the similes be correct or not, it is certain that under the old *régime* the master mariner often went unharmed and his costs were light; whereas, under the new, he has not unfrequently been gobbled up, body and bones, by the grievous and inevitable costs. What with "perfect tribunals," "Courts of Appeal," "protracted inquiry," and costs, we are not sure that the measure of justice, secured by the new Act, may not be an expensive treasure. When, however, sentiment is allowed to become chief factor; the outline, coloring, clothing, and pose of a thing are often deemed of more value than the thing itself. After all, that is a matter for "the profession" (who now possess that which they have so long desired) rather than for those who, like ourselves, are lookers-on. To us, who regard the matter from a public

point of view as well as from a class standpoint, it seems that the master mariner has too often been unable to remember or to heed public policy or the interests of public safety. He has been too much like the fly on the wheel, regarding himself as the centre and mainspring of, rather than an incident in, the British Mercantile Marine.

However, "let by-gones be by-gones."

Undoubtedly under the system of 1876 certain grievances (some of them, however, *des maladies imaginaires*) had manifested themselves. Judging from the utterances of the purely class journals and from our own correspondents' letters, they may be arranged as follows:—

1. Cases were tried in police courts, which was, as those Courts were used at other times for trying brawlers, peace breakers, and other persons guilty of offences against law, order, or morality, "an insult to the profession."

2. One officer of the Royal Navy *might* sit as an assessor with one officer of the Mercantile Marine. This put the naval officer on an equality with the master mariner, and no officer of a well-manned, well-provided, well-equipped, and well-ordered ship of the Royal Navy, could possibly comprehend the difficulties which beset a master mariner on board a mere merchant ship. This was deemed to be "unfair to the profession."

3. It is a matter of form for naval officers when tried by court martial to hand in their swords; in like manner the law required certificated officers to hand in their certificates pending inquiry. As no one should be asked to hand in his certificate until after inquiry, this was deemed to be "an insult to the profession."

4. Every offender against ordinary law, order and morality, is tried by a jury of his own peers. Two assessors were not deemed to be peers enough to try a master for running his ship ashore. That the master mariner should not be tried by a jury of his peers, when that privilege is extended to malefactors, is "an injustice to the profession."

5. There is an appeal in all, or nearly all, civil cases. That there should be no appeal from the Court of the Wreck Commissioner or other Court which inquired into the ways and doings

of master mariners, was "a wicked and a crying wrong to the profession."

6. In civil and criminal cases the judge has no power to select the jurymen, whereas the judge of the Wreck Court selects his own Assessors out of a list. Some of the various judges were deemed to cultivate favourite and complaisant assessors. This was "an injustice to the profession."

7. Some assessors are believed to have touted for work; this led master mariners to believe that assessors might possibly prefer to obtain employment rather than to be disagreeable to the Court, who would not employ them again if they were unpleasant. This was deemed to be "dangerous to the profession."

8. Assessors have in some cases acted in such a way as to give the impression (probably quite wrong) that, from some reason never fully fathomed, they are really afraid of the judges, and have neglected to stand out on professional points when they ought to have done so. This was deemed to be "betraying the profession."

We have, in the above list, put the case as mildly as we can. If we had used words that have been used by some of our correspondents and informants, we should have used many adjectives and grievous language generally. The two grievances numbered 5 and 6 in the above list were real and substantial, besides being sentimental. Those numbered 1, 2, 3, and 4 are purely, or to a very great extent, speculative and sentimental; and as regards those numbered 7 and 8, we are fairly nonplussed. We happen to know something of some of the assessors named in the Home Secretary's list, and we can assert that none of them are in that ragged or poverty-stricken condition which would render touting, or asking for alms, necessary to enable them to live; and, moreover, we distinctly deny, on the part of (but *without* the authority of) the whole of the assessors, that there is one of them so utterly wanting in respect to himself and his fellows as to allow his opinions to be ignored, or himself so contemptuously treated as has been hinted at. A sailor who, in order to increase his chances of "getting another job," would throw up or suppress his honest opinions and convictions and the traditions of

the profession, who would neglect to say his say in a proper and effective manner and in proper place and season, would be too contemptible a being to possess a master's certificate or a Queen's commission.

The clause as to assessors in the new Act is somewhat vague. Its intention is, of course, only known to its framers; but looking at it as it stands, it means one of two things, either that the Royal Naval Assessors are to be ousted altogether, which is probably what the master mariners want, or that three assessors shall be appointed in every case, which is probably what the interests of the public require. If three assessors are appointed in any case whenever a certificate is to be dealt with, two of them must have served in the Mercantile Marine. If those members do not give proper advice and do not see that proper questions are asked of witnesses, and answered, one of two things will happen; they will either debase themselves, or they will mislead the Court or suffer it to mislead itself into error. This should be borne in mind, for if assessors neglect the public interests in their anxiety to screen a master or to get another job, they will certainly throw on the Board of Trade the duty of securing a re-hearing of the case, while if they err in the opposite direction they will also certainly throw on the master the cost and anxiety attendant on a re-hearing.

Besides the masters and mates, there is a body of men in the Mercantile Marine whose case we have on more than one occasion advocated—we refer to the certificated engineers. As a class, there is no body of men more intelligent, more deserving, and less obtrusive; and there is no class who think they suffer more from the jealousies of the masters and mates. If it was an evil too grievous to be borne by master mariners that they should be sat upon by two officers, one of whom was not a merchant captain while the other was, how much the more grievous must it be for a sea-going engineer to be sat upon by assessors, not one of whom has had experience as a sea-going engineer in the merchant service, and whom the Engineers—of course, without reason and purely as a matter of sentiment—regard as anything but *their* peers. It may be said as regards engineers that public policy

requires, in their cases, that one assessor at least should be an independent officer, who is not connected with the profession as a sea-going engineer. This may be undoubtedly true; but, if so, it is no more true in the case of engineers than in the case of masters and mates. The Act requires that, before a certificate can be dealt with, the case must have been heard before assessors, of whom *two* must be persons "having experience in the Merchant Service." Under the Act, therefore, an engineer having that experience is competent to serve as an assessor to try a master or mate. As no body of master mariners would agree to a sea-going engineer acting as an assessor in the case of one of their body, it is only doing as they would be done by for master mariners to refuse to sit as assessors on sea-going engineers. Again the sea-going engineers have more sense on their side if they were to object to a master mariner sitting on them, than ever a master mariner has had to one naval officer sitting on him, and it is only doing as master mariners would do, if counsel employed by an engineer were to object to masters acting as assessors in his case. Whatever the master mariners may think, we are certain that the public will not regard with confidence a tribunal on which two master mariners, or two sea-going engineers, can, if they choose, in the interest of their class, overrule the Court. As the decision of the Court is of no effect unless one assessor agrees with the judge, it is more fairly arguable in the general interests of the public that one of the assessors at least should be an independent person owing no allegiance whatever to sea-going engineers or to master mariners as a distinct body or class, than it is arguable in purely class interests that no officer of the Navy of the public, the Royal Navy, should act as an assessor. The public have as much right to expect to be represented on these investigations, as have the master mariners as a mere section of the community. When the rules are made we shall know more about it, and shall then be able to discuss the whole subject with our correspondence. We cannot help, however, expressing an opinion that master mariners, having obtained the right of appeal from the Court of the first instance, will very rarely find a decision against which they will desire to appeal.

The Act comes into force on the 1st November next, and is in substance as follows :—

Short title.—This Act may be cited as the Shipping Casualties Investigation Act, 1879.

Re-hearing of and appeal against investigation into shipping casualty or misconduct of officer.—(1.) Where an investigation into the conduct of a master, mate, or engineer, or into a shipping casualty, has been held under the Merchant Shipping Act, 1854, or any Act amending the same, or under any provision for holding such investigations in a British possession, the Board of Trade may, in any case, and shall, if new and important evidence which could not be produced at the investigation has been discovered, or if for any other reason there has in their opinion been ground for suspecting a miscarriage of justice, order that the case be re-heard, either generally or as to any part thereof, and either by the Court or authority by whom it was heard in the first instance, or by the Wreck Commissioner, or in England or Ireland by a judge of Her Majesty's High Court of Justice exercising jurisdiction in Admiralty cases, or in Scotland by the senior Lord Ordinary or any other judge in the Court of Session which the Lord President of that Court may appoint for the purpose, and the case shall be so re-heard accordingly.

(2.) Where in any such investigation, a decision has been given with respect to the cancelling or suspension of the certificate of a master, mate, or engineer, and an application for a re-hearing under this section has not been made or has been refused, an appeal shall lie from the decision to the following Courts; namely,

(*a.*) If the decision is given in England or by a Naval Court, the Probate, Divorce, and Admiralty Division of Her Majesty's High Court of Justice :

(*b.*) If the decision is given in Scotland, either Division of the Court of Session :

(*c.*) If the decision is given in Ireland, the High Court of Admiralty, or the Judge or Division of Her Majesty's High Court of Justice exercising jurisdiction in Admiralty cases.

(3.) Any re-hearing or appeal under this section shall be subject

to, and conducted in accordance with, such conditions and regulations as may from time to time be prescribed by general rules made under section thirty of the Merchant Shipping Act, 1876.

Rules as to investigations into shipping casualties and misconduct of officers.—(1.) The list of persons approved as assessors for the purpose of formal investigations into shipping casualties shall be in force for three years only, but persons entered in any such list may be approved for any subsequent list. The list of those persons in force at the passing of this Act shall continue in force until the end of the year one thousand eight hundred and eighty: but nothing in this section shall affect the power of the Secretary of State to withdraw his approval of any name on any such list, or to approve of any additional name.

(2.) The assessor or assessors for each such investigation shall, instead of being appointed by the commissioner, justices, or other authority holding the investigation, be appointed in such manner and according to such regulations as may be from time to time prescribed by general rules made under section thirty of the Merchant Shipping Act, 1876.

(3.) Where any such investigation involves or appears likely to involve any question as to the cancelling or suspension of the certificate of a master, mate, or engineer, it shall be held with the assistance of not less than two assessors having experience in the Merchant Service.

(4.) A master, mate, or engineer shall not be required to deliver his certificate under Section four hundred and thirty-eight of the Merchant Shipping Act, 1854, or Section twenty-four of the Merchant Shipping Act, 1862, unless the certificate is suspended or cancelled, and the words "or is to be" in the latter of those sections are hereby repealed.

(5.) Investigations into shipping casualties shall be held in some town hall, assize, or county court, public building, or in some other suitable place to be determined according to general rules made for the purpose by the Lord High Chancellor of Great Britain: and unless no other suitable place is in the opinion of the Board of Trade available, shall not be held in a Court ordinarily used as a police court.

(6.) Any general rule made in pursuance of this Act shall be laid before both Houses of Parliament within thirty days after it is made, if Parliament be then sitting, or if not, within thirty days after the commencement of the then next ensuing Session.

THE CHINESE MARITIME CUSTOMS.

OUR last war with the Chinese, as is well-known, ended in the complete success of the allied arms. The capital fell into the hands of the English and French forces. The palace of the Emperor was ransacked and destroyed. The Court fled beyond the Great Wall, and the dynasty suffered a humiliation, such as it had never been called upon to submit to, at the hands of foreigners, since its founder usurped the throne of the Celestial Empire. The condition of the country, when the English and French treaties were signed, was deplorable. The regular forces of the Government had met with defeats wherever they had ventured to encounter those of the Allies. One of the greatest and most hideous of the many rebellions which have occurred in the history of China had remained for years unsuppressed, and was devastating a vast portion of her territory. Insurrections were taking place in other provinces, hitherto kept in order; and the expenses of the war with the European Powers, and of the contest with the insurgents, and the general fiscal mismanagement of the Mandarins, had brought the finances into a condition of disorder which, even in the Middle Kingdom, has probably not been often paralleled. It is not surprising that the miserable circumstances of the country excited a feeling of compassion in England. Though we could scarcely charge ourselves with having caused the war recently concluded, we admitted that we must have diverted from employment in suppressing the great Tae-ping revolt the generals and armies who essayed to withstand the advance of our own troops; and we did not dispute that an unfortunate result of the conflict, from which we had just emerged, was the indirect support which it had given to ferocious rebels, by the diversion it created in

their favour. In the moment of victory it was felt that we could afford to be generous; a sentiment, the intensity of which was not diminished by the conviction, soon forced on us, that generosity to our fallen foe would be productive of very substantial advantage to our own interests in the Far East.

The Tae-ping rebels, whilst we had been providing work for the Imperialist forces elsewhere, had got unpleasantly near the great commercial centres, in the prosperity and good government of which foreign merchants, and our own especially, were deeply interested. In the complete disorganisation which the presence of the ruthless insurgents always occasioned, local revolters had found opportunities of actually seizing, and holding in defiance of the lawful authorities, some of the treaty cities, even before we had come to blows with the Central Government. The conduct of business, official and commercial, at the provincial ports had, owing to the weakness of many of the local officers, already been attended with sufficient difficulties; it now seemed threatened with complete frustration, by the anarchy which was rapidly spreading over the Empire. It became a serious question whether foreigners might not have to withdraw altogether from the chaos of misrule into which the country seemed likely to be plunged. To prevent the consequent annihilation of the vast interests of Great Britain in the commerce of the East, it was wisely resolved that some assistance should be given to the Chinese Government in its attempts to extricate itself from its terrible difficulties. The assistance eventually rendered was of two kinds—direct and indirect. Officers were allowed to take service in the armed forces of the Emperor, with the express intention of acting against the rebels. Instructors were lent to train the Chinese levies in the methods of European warfare. And, in certain cases, British troops were permitted to repel the advance of the insurgents, when they approached too near to the places to which our merchants were admitted to trade by the provisions of the treaty lately signed. The final suppression of the revolt, which had torn the distracted country for so many years, was in large measure due to the ability of our countryman, Colonel Gordon. The previous security of the great commercial city of Shanghai,

was to be attributed to the countenance and support given by Her Britannic Majesty's naval and military forces, still in that part of China, to the armies of the Mandarins, and sometimes to the direct participation of the former in the operations undertaken by the latter.

Whilst material assistance was thus being more or less directly afforded to the Chinese authorities in the great struggle in which they were engaged, help of a less brilliant, but it may be hoped of an equally effective, and of a more enduring character, was being extended to them. This consisted in a tacit permission granted by their own Governments to certain foreigners—chiefly subjects of Her Britannic Majesty—to take part in reorganising the disordered finances of the Empire, by establishing a system of Customs' management which should resemble that in force in Western States. By this it was hoped that an important branch of revenue might be properly administered; that the central Government might be placed annually in possession of a considerable sum of money of which it was sorely in need; and that there might be introduced into the collection of dues and the regulation of seaports an uniformity which would have a highly beneficial effect on trade. How far the scheme has been successful, and to what extent these hopes have been fulfilled, it is the object of this article to explain.

That some reform in the Customs' administration of China was needed will be at once perceived, if attention be paid to the accounts of the system in force—if system it can be called—before the adoption of the new plan, given by every person who was in a position to observe its working. It should be remembered that the maritime commerce of China, apart from the coasting or junk trade, is practically of very recent origin. Till the extinction of the exclusive privileges of the East India Company, less than fifty years ago, the whole of our trade with the Empire was in the hands of a single corporation. When the Leadenhall Street monopoly ceased, the increasing business was still confined to one port, that of Canton. The Treaty of Nanking, which resulted from the war of 1840-2, threw open to trade four other ports, and in reality laid the foundation of that vast ocean commerce in which

this country has so large a share. It will be readily believed that the existing Custom House arrangements, even if they had been suitable to the requirements of the old limited traffic, would prove absurdly inadequate to the new conditions resulting from an opening of the trade to the great commercial nations of the world. However excellent the organization appeared to be on paper, in fact it was something worse than imperfect. There was a want of uniformity in the modes of levying duties, and a general laxity in enforcing regulations which, had the administration been purity itself, would have set at defiance all hopes of maintaining the annually increasing business intercourse with China on a proper footing. But the administration was, even for the Celestial Empire, singularly corrupt: and every vice of organization—and such vices were not few—was intensified by a system of embezzlement, which had become almost legalised by prescription, and which even honourable men failed to regard as improper.

The late Dr. D. F. Rennie, in an interesting work* recording the early experiences of Her Britannic Majesty's Legation at Peking, tells us that he saw much at that capital of a Mandarin of high rank named Hang-ki, who had been *Hoppo*, or Collector of Customs at Canton for five years. During the latter part of his incumbency trade was greatly interrupted owing to the war, and for one year and a-half none, or nearly none, was carried on. Dr. Rennie learnt a good deal of the practice of high Chinese officials with regard to the revenue derived from Customs' duties. He found that it was the rule, when the Hoppo returned to Peking, after having served his term of office at Canton, to pay down before entering the city a sum of more than £3,000 for every year that he had been in office. This handsome fee was a perquisite of an officer styled the "Captain-General of the Nine Gates," a kind of Marshal of the Palace. This personage was considerate enough to make no demand for the period when business was at a standstill, but contented himself with the moderate sum of £12,000, instead of about £17,000, which the late Hoppo had to pay before being permitted to pass the gates.

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* "Peking and the Pekingese." London, 1865. Vol. I., p. 249.

That "peculation" is rife in official circles in China, and that "squeezing" is an ordinary habit of Mandarins, is generally accepted as a fact by foreigners; but probably few have ever imagined that the practice was indulged in by the most illustrious personages in the Empire. It seems that the Son of Heaven himself condescended to share in the "squeezing" which his courtiers compelled the ex-Hoppo to submit to. To quote Dr. Rennie: "He also presented to the Emperor, on each of the two occasions that he had an interview with him on his return, a red card—cheques in fact—for ten thousand taels [£3,300], which the Emperor sent to the bank and received the money for." There is a sublime absurdity in a sovereign participating in the embezzlement of his own revenues which even surpasses that of borrowing money to provide a sinking fund for a debt. His Majesty seems to have come to the conclusion that he had not robbed himself enough, so he squeezed Hang-ki a third time, also to the tune of ten thousand taels. The opinion of observers on the spot was that this sovereign was "fully cognisant of, and encouraged irregularities in booking such as those just mentioned, as a means of providing a sort of reserve fund for himself to draw on in times of need." It is stated that he frequently sent commissions to the Hoppo of Canton to execute for him, it being fully understood that any sums so expended were not to appear in the public accounts, and it being "equally well understood that the Hoppo was not to expect any remittances on account from the Imperial purse." From which it would seem, observes Dr. Rennie, "that a systematic falsification of his accounts forms a portion of the recognised duties of a Chinese collector of Customs."

It would seem also to be a practice which is capable of being officially defended. The author already quoted gives us an account of a conversation between Mr. Hart, the present Inspector-General of the Chinese Customs, and the senior subordinate of Hang-ki, the subject of which was the misappropriation of Custom House funds by Mandarins of high rank. The Englishman asked, in astonishment, if it was really contended that the large sums, which Hang-ki had to retain to meet the "squeezing" to which he knew he would be subjected on his return to the capital,

had been properly exacted? To this it was replied, that the proceeding was perfectly regular; that the accounts were quite correct; and that the money was properly accounted for. In fact, according to the Chinese official view, the matter could be satisfactorily and easily explained. During Hang-ki's period of office, smuggling was very prevalent in the Canton river; so much so that the expenditure of large sums in the construction and equipment of revenue cruisers would have been amply justified. This appropriation of a portion of the Customs' revenue, justifiable as it would have been, was not made, but figured in the accounts as though it had been. The result was that the Government suffered no loss, for had not the Hoppo prudently retained possession of the funds to satisfy the demands of his Imperial Master and his courtiers, they would have been expended in providing an efficient coastguard, which would have proved even more costly than the rapacity of the palace; the Peking Government, therefore, was not only not a sufferer, but a positive gainer by the arrangement.

It would not be easy to paint in stronger colours the vices of the native system of collecting revenue than those which were used by the Mandarins in thus defending it. How it worked in practice, and how it affected trade, will be found very clearly stated in a paper, drawn up at the request of Sir Frederick Bruce —the first British minister resident at Peking—by Mr. Hart, than whom no one could have better means of getting at the truth. "This impartial and trustworthy document," as Sir F. Bruce called it, was presented to both Houses of Parliament in 1865, and constitutes the only authentic and official history of the foreign Customs establishment in China yet published.

The mode in which the business of collecting duties was carried on under the old plan is in striking contrast with that introduced by the new. There was a minute and precise tariff, by the provisions of which commodities would have to pay, in import and export dues, about 10 per cent. *ad valorem*. The tariff, however, was nowhere enforced. The Customs' revenues at each port was, to a certain extent, "farmed." Each local Custom House had to account annually for a certain amount. The balance, if any

remained, was held to belong—subject, of course, to the "squeezes" already spoken of—to a Mandarin, who filled some other position, and was not simply a collector. Officials not succeeding in collecting the amount were recorded as defaulters, and had to make good the deficiency. Means, however, existed, as we may well believe, of avoiding so disagreeable an alternative. As a rule, the amount claimed from each port was small, however considerable the aggregate return from all the Custom Houses of the Empire may have been. The responsible heads of the establishment had invariably other and more important duties to perform, and left the collection of the comparatively insignificant sums, which had to be transmitted to the Treasury, to their subordinates; only taking care that their own share of the surplus was secured to them. The result was that the tariff rate became a dead letter, and simply represented the *maximum* legal duty. No wonder that this "encouraged, if it had not originated, a species of dishonesty, in which the subordinate lies to his superior, who, again, winks at such knavery, involved as he himself is in turn in precisely similar transactions."

The corrupt officials grew dissatisfied with the gains of a single-handed plundering of the Government, and betook themselves to robbing with both hands. The merchant was made to bear his share in this spoliation; though, being on the spot, he could to some extent protect himself. The payment of duties became a system of bargaining between the importer and the Custom House. When the foreign merchants began to appear on the scene in increasing numbers the evils were intensified. At Canton, the oldest seat of foreign trade, the business of collecting dues on foreign cargoes fell into the hands of a class of middlemen, styled "linguists," who purchased their positions, and received no salary. The employment of interpreters of some kind was of course essential to the conduct of business; and these men enriched themselves rapidly by improper gains at the expense of the revenue. Fortunately for the foreign merchant, the "linguists'" occupation was known to be so remunerative, that the ranks of the profession were more than filled; and there arose a competition amongst them for the patronage or custom of the

stranger. The whole process consisted of a connected series of falsification and embezzlement as the sum levied as duty passed from hand to hand, an account of which shows that the Unjust Steward of the Parable would have found much to learn at Canton, and that, as we have been told in the *Biglow Papers*—

"They did not know everything down in Judee."

A merchant desiring to pass goods through the Custom House, made a bargain, the best he could, with a linguist, who came to an arrangement with the *Hoppo's* non-official deputy. The deputy reported to the recording clerks of the *Yamun* (local office), "taking care to deduct the percentage to be put aside for the private purses of himself, his master, his master's friends, the people in the *Yamun*, the Governor-General, through whom the reports are forwarded to the Board, and the clerks and officials connected with the Board of Revenue itself." Under these circumstances perhaps it is hardly fair to blame the Emperor for yielding to the universally unresisted temptation, and putting his sacred hand in the till himself. If, according to the tariff, the sum of 1,000 taels should have been paid on the cargo, the linguist bargained to get it through for 800; taking care to tell the deputy that he had only received from the merchant 750. The deputy thereupon let it pass for 700, from which sum he deducted 200 to satisfy all demands made by his friends and the high Mandarins on the spot, and directed 500 to be entered in the books as paid into the office on account of revenue. The Government therefore received just one-half of what it was legally entitled to. Of course such practices did not tend to raise the standard of commercial morality at the great centres at which foreigners were by treaty allowed to congregate. They, further, put positive disqualifications upon honest trading, and placed the upright merchant at a great disadvantage in comparison with his less scrupulous competitor. There can be little doubt that it is to the system, which has been described as being in force in the earlier days of foreign intercourse with China, that the scant respect with which the officials of the Empire are apt to regard the mercantile body as a whole is to be attributed. It fostered a spirit of con-

tempt for all observance of the revenue laws, and encouraged a class of traders whose character became only too notorious, and whose evil practices have sometimes been unjustly attributed to the many honourable firms whose repute is as high as that of any in the world.

With the increase of trade the necessity of reform became imperative. When we see what they have done at Shanghai and elsewhere, it would seem probable that the foreign merchants, the great majority being our own countrymen, would have themselves hit upon some plan which would give honesty a fair chance in the competition for business. As it turned out, there was no cause for their direct interference. Her very misfortunes came to the relief of China, and resulted in establishing a great public department, which has already been productive of enormous benefits to her, and will, almost of a certainty, confer upon her still greater ones in the future.

When the great wave of the Tae-ping revolt had reached the neighbourhood of Shanghai, bands of local insurgents, known as the Triads, taking advantage of the general disorder into which the country had been thrown, seized the native city (as distinguished from the foreign settlement, which is outside its walls) and held it from 1853 to 1855. Some men-of-war belonging to the Treaty were in the river and afforded protection to the foreign residents, a protection which was supplemented by the energetic measures of defence taken by the residents themselves. The native authorities were driven away. Business went on as usual, but the collection of duties had passed from the hands of the Mandarins. A writer of the day remarked that "there was a general *saturnalia* of so-called free traders." An *impromptu* system was devised, under the sanction of the foreign Consuls. In 1854 they, and the Chinese Superintendent, met in conference, and it was agreed that the latter should have the assistance of foreign gentlemen of position to secure an honest Custom House administration. Each Consul nominated one person. Mr., now Sir, Thomas Wade, our present Minister at Peking, was nominated by the English Consul.

The new plan was such an improvement on the old that it is not

surprising that the satisfaction which it gave to nearly all concerned exceeded the most sanguine anticipations. The Shanghai Chamber of Commerce, in 1857, advocated the extension of the system to the remainder of the then treaty ports. It was stated by an independent authority in the next year that it had worked with entire success. Duties had been "fairly and fully collected from all alike for the first time." The Chinese revenue had been increased by more than a million and a-half of dollars at a single port. The new Board did more than introduce honesty and order into the collection of Customs' duties; it began to improve the navigation of the Great River. Buoys were laid down, beacons erected, and a light-vessel was moored to mark a dangerous sand-bank. It also allowed the establishment of bonded warehouses, a great convenience to merchants. Lord Elgin put on record his conviction that, "nothing could be more satisfactory than the working of this institution;" the credit of introducing which he gave to Sir Rutherford Alcock, then Consul at Shanghai. In 1862, Sir F. Bruce stated that the money collected at Canton under the new system was nearly four times that obtained under the old. "The results of foreign management," he says, "have been the same at every port where it has been introduced."

The system had, as will be seen, been extended to other treaty ports. At first the new institution was simply a foreign inspectorate, and was a foreign rather than a Chinese department. It more and more assumed the character of the latter. On Mr. Wade's resignation, the English Consul nominated Mr. Lay, C.B., and then ceased to nominate. Lord Clarendon, though not opposed to the employment of Englishmen to aid the Chinese in the collection of duties, objected to any interference on the part of our Consuls in the appointment of such persons. The United States Government had already decided to take the same course. The native authorities thereupon placed the entire control of the Customs in the hands of the English Inspector-General, with power to select all Europeans employed in the service. The extension of the system to the other treaty ports was, therefore, the act of the Chinese Government alone. The inspectors at the ports ceased to bear officially the character of representatives of

the different nationalities. In effect the service is most thoroughly representative of the different countries trading with China, natives of all filling posts in it. The staff was simplified and the management became more economical. The inspectors were superseded at each port by a single Commissioner, under whose orders were assistants, clerks, and tide-waiters of various nationalities. The importance of the new service may be imagined when it is learned that after its members had been stationed at each of the fourteen ports opened to foreign trade after the late war, it employed no less than 400 foreigners and 1,000 Chinese.

It was scarcely to be expected that there would not be some exceptions to the very general satisfaction with which the introduction of the plan had been received. The old Custom Houses displaced by it contained, as has been already shown, only too many officials directly interested in a continuance of the malpractices, which the new method was so powerful in putting a stop to. When the members of a bureaucracy hang together, the strength they can put forward is enormous. The *vis inertia* of such a body in China opposed to reform, especially when the reform was being carried through by foreigners, must no doubt have proved exceptionally great. It certainly does credit to the Peking Government, that it had the courage to resist the tremendous pressure that must have been put upon it to respect certain "vested interests," and leave undisturbed the ancient rights of peculation and embezzlement which had been exercised, as has been seen, by even the most august personages in the Empire. Even in the west a Government which essays to put down administrative abuses, or terminate a course of systematic infraction of laws and regulations on the part of its servants, when the practice is of old standing, and directly concerns the pockets of individuals, has a hard task before it. But in this case the difficulty of the task must have been infinitely greater. First, it was in China, where prescription is held to justify, if not to sanctify, nearly everything of no matter what character. Next, the gains, perhaps the livelihood of a vast body of public servants were more or less immediately threatened; for "the potentiality of growing rich beyond the dreams of avarice" always lies behind

the modest appointments of a provincial Mandarin, gifted with a robust conscience. But what constituted, probably, a greater obstacle to improvement was, that the interests of the Palace, with its courtiers and eunuchs, must suffer considerably by the introduction of honesty into the Administration, and of a proper system of accounts. "Squeezing" in China, a practice to which in England we give the more delicate name of "commission," is universal; and it must have seemed needlessly cruel to many of the educated inhabitants of the Empire, that the Government was positively going to take away from natives the glorious chances which an extension of trade promised, merely because some "foreign barbarians" were trying to impress upon it the advantages of an incorrupt collection of the revenue. That the Prince of Kung and his colleagues faced these difficulties, and made the reform, is surely no small proof that those who believe that the cause of improvement in China is by no means hopeless, have good grounds for their opinion.

(To be continued.)

STATE PROSECUTIONS v. COMPULSORY SURVEYS.

TWO cases have recently been before the Courts which have set us thinking once again over the proposal of Mr. Plimsoll and his following, that all ships should be classed by a Society like Lloyd's Register, or be surveyed by an officer appointed by the Government before they are allowed to proceed to sea on any voyage.

We are with those who have protested against the compulsory survey or classification of all ships, but who have advocated the punishment of persons who knowingly take or send ships to sea in a condition likely to expose needlessly or recklessly the lives of other persons to imminent peril. We have all along protested against action by the State tending to hamper enterprise by attempting to prevent men from incurring risk which, with a full knowledge of it, they are willing and often desirous to incur. At

first sight, failure in the two cases we are about to refer to might be taken as showing that the view we have maintained is the wrong one, but on full consideration the result does not shake our faith in the least.

It is true that if every ship had to be surveyed and certified before proceeding to sea on any voyage, the steamer *Arbutus* could not have gone on the voyage, to which we are about to refer, in the very dangerous state she did, and it is also true that a voyage made by the barque *Galatea* would not have been the subject of a law suit; and that such ridiculous cases as may be typified by "Kain *v.* Farrer" would not waste the time of the Law Courts, and the public money.

But when we have granted these points, we have conceded all we can concede, and against our view, they really amount to very little. In the first place, many "classed ships" have been detained as unseaworthy, and some have been greatly repaired, or actually broken up on detention. In the second place, "classification" and "safety" by no means mean the same thing. In the third place, universal compulsory classification and annual Government survey mean wholesale condemnation, and possibly the extermination of numerous lower class vessels in which life is not largely lost, without adding additional safety to vessels of classes in which life is lost. That we are right in this is proved by the disastrous results that have followed the application of "Plimsoll's" Act, for under it, the smaller wooden vessels, schooner and brigantine, are being rapidly swept out of existence: whilst other (classed) ships disappear at sea much the same as of old.

The case of the *Arbutus*, to which we first refer, is as follows:—She was a carefully built iron vessel, good of her sort. Being in the harbour of Maryport, and having taken on board a cargo of coals, she is reported to have taken the ground on an uneven bottom. She heeled over on the port side, and a rent took place on the starboard side, extending from the top through the stringer plate, down to the turn of the bilge. She made water, and continued making it for some days. It appeared in evidence that but for a wooden stringer or rubbing piece, she would have parted altogether. Evidence given in favour of the

master was to the effect that his iron ship, broken down the side through the sheer strake and admitting water, was a seaworthy ship. The learned judge who tried the case observed that such a statement "startled him."

It appears that when the vessel was in Maryport, one of the Board of Trade surveyors went on board and found her as we have described. Indeed there is no dispute as to the extent of the damage. The master did not dispute that. The surveyor might and ought, under the Act, at once to have reported the case for detention. He did not do so, but indulged in the following conversation with the captain instead:—He asked, "Do I understand now, captain, that you do not intend to go to sea until your ship is repaired?" and the captain answered, "I would not even get steam up until she is repaired." Thereupon the surveyor replied, "If you tell me that, I won't interfere further; I rely upon your statement that you won't go to sea until the ship is repaired." Notwithstanding that promise, which entirely misled the Board officer, the master took her to sea, after having applied a caulking of oakum and red lead, and taken out some of the cargo. The witnesses who testified in Court as to the absolute unseaworthiness of the ship were witnesses of a very high character and of special knowledge and fitness to speak with authority. They were, Mr. Wilkinson, an independent builder and repairer of ships; Mr. Flannery, a naval architect, also an independent witness; Mr. James Wimshurst, Mr. Leighton Mills, Mr. Taffs, and Captain Kiddle, all of the Board of Trade; and against them were a great number of persons, ship captains and others, who testified to her seaworthiness. We must here remark that the learned judge who tried this case attached weight to the evidence brought forward by the Board of Trade, and pointed out that the question involved was really one of pure and abstract science including factors such as her longitudinal strength, the effect of the fracture on weakening the ship, and the amount of strain necessary to completely break her, and so forth; and he did not place much reliance on the mere statement of masters and mates of vessels and workmen brought forward by the captain, who asserted that the ship was seaworthy, some said even to go across the Bay of Biscay, and this when it

was proved in evidence that the wooden belting alone kept her fractured side together. In the case of the *Arbutus*, the judge made some exceedingly valuable remarks on the question of seaworthiness, which we reproduce *in extenso*. His lordship said, after commenting on the extraordinary opinions which had been expressed by the captains and the workmen, "I understand it, that by seaworthy, she is not seaworthy unless she is fit to go to sea under all circumstances, that is to encounter every danger that may imperil her upon the voyage she undertakes. She is not seaworthy because she might pass between this (Dublin) and Holyhead on a summer day on a smooth sea without accident, that would not make her seaworthy; but the seaworthiness meant by the Statute is that she is fit to encounter, as far as human care can make her encounter, the perils that she may encounter on the voyage she undertakes. The voyage was from Maryport to Dublin; it was in winter, the last week of January, one that we practically know is about the stormiest period of the year, when we are liable to very sudden storms. You are not to determine seaworthiness by whether the *Arbutus* did pass in safety across the channel, but whether she was in a condition to encounter the perils she might sustain upon such a voyage as that from Maryport to Dublin." So much for the judge's view. Mr. Dunsfield, one of the witnesses for the captain, a practical boiler-maker and repairer, testified on oath that "she would have gone to pieces in the harbour of Maryport but for the wooden belting;" that is the rubbing piece. The questions put by the judge to the jury were, (1.) "Whether was the ship on the morning of the 26th January, 1879, in such an unseaworthy condition as that the lives of those on board were likely to be endangered?" On this the jury found "Yes." (2.) "If she was in that condition, did the captain know she was?" The anwer of the jury was "No." (3.) "Was it reasonable or justifiable for him to go to sea under the circumstances?" The answer of the jury was "Yes."

In this case the bravery of the captain was indisputable, and his zeal for his owner was absorbing; but his want of candour to the Board of Trade surveyor was deemed to be a very serious blot, for the surveyor was, by this captain's assurance that the ship

would not go to sea until repaired, entirely misled and so failed to perform the duty imposed on him by the nature of his appointment as a public officer. The result of the case is fortunate for the captain, we are glad it was so, for his fearlessness and skill deserved and won recognition. We heartily sympathise with him throughout, and trust he may long live to benefit by it, and there is no slur of any sort on the owner, as he left it to the master to bring the ship across if he could do so with safety.

The verdict of the jury, and, indeed, the summing-up of the judge, but overwhelmingly the verdict of the jury, establishes the fact that a master mariner of the experience and status of the master of the *Arbutus* does not know that an iron ship, cracked down the side through the stringer plate to the turn of the bilge is not seaworthy, and that that very ignorance renders his taking that absolutely dangerous ship to sea reasonable and justifiable on his part. This being the view of the jury, and we by no means say it is not the correct view, there can be little doubt that the register societies and the Government departments, which have to do with the survey of ships and the deciding whether they are fit to go to sea, are very wise in declining to appoint master mariners of that class as surveyors. It has been a matter of complaint among certain sailors that they have not been entrusted with the duty of surveying ships, but their complaint is effectually answered by the fact that witness after witness of their class, was ready to testify, and did testify that a wooden rubbing piece is such a great element of strength in an iron ship as to render her seaworthy when open through the stringer plate and down the side to the turn of the bilge. It was stated in Court that a sailor, as a rule, acquires no more knowledge of the strength or construction of a ship, or of the effects of damage or deterioration in her structural strength, than a coachman, by driving a carriage for years, acquires a knowledge of coach construction and repairing; or a person, by dwelling in a house for years, acquires of house building and structural repairs. To our mind this statement is far too broad. There are many cases in which master mariners do acquire a great knowledge of ship construction. We object to the universal application of the

statement that master mariners are glaringly ignorant of matters connected with the structural points of ships; but we cannot contest its principle, since it was displayed in this case very conspicuously, and so far asserted, relied on, and acquiesced in, as to lead to proper absolution.

The other case we refer to is that of the barque *Galatea*. The information was, "that ——, of ——, the managing owner, did unlawfully send a certain British ship, to wit, the *Galatea*, to sea in such unseaworthy state that the lives of certain persons were likely to be thereby endangered, contrary to the form of the Statute, &c., and against the Peace of our Lady the Queen, her crown and dignity, &c., &c."

The managing owner was proceeded against, not on account of a voyage the ship was about to make, not for an "attempt" to send the vessel to sea in an unsafe state, but after the last voyage out and home had been successfully completed, he was proceeded against for having sent her on that voyage. The *Galatea* like the *Arbutus* made the voyage in safety. The following are the facts as we gather and consider them from the report in the *Shields Daily Gazette*, of the 10th July last:—

"Mr. Cave, Q.C., Mr. Beasley, and Mr. Steavenson appeared for the prosecution; and Mr. Edge, Mr. Strachan, and Mr. Liddell for the defence.

"Mr. Cave stated that the *Galatea* was of 335 tons burthen, 116ft. long, 26ft. broad, and 16ft. deep. The voyage upon which she was sent, and which formed the subject-matter of this indictment, was a voyage from Blyth to Cronstadt, and back to Dover, upon which she was sent on the 13th September, 1878. The *Galatea* was built in North America in 1849, so that at the time in question she was about 30 years old. She was composed of spruce and hacmatach wood, a wood used in shipbuilding, but not the best kind of wood for the purpose, being more liable to decay than some woods. On the 21st June, 1872, she was registered as a British ship, with the defendant as managing owner. From this time down to the time she was condemned, the defendant continued to be the managing owner. The *Galatea* sailed from Blyth for Cronstadt with a cargo of coals and returned to Dover

with deal battens. She had not been at Dover long before the attention of the Board of Trade surveyor was drawn to her condition. She was consequently surveyed and temporarily detained; afterwards further surveyed, found to be in an extremely rotten condition, and ordered to be repaired before proceeding again to sea. When the *Galatea* came to be examined she was found in regard to her hull to be in a most rotten condition. The deck was rotten, and sheathing had been placed over to prevent the water finding its way through the rotten places into the hold. When the vessel was sold—because it was in that condition that it was considered more to their interest to sell it for what it would fetch than undertake the repairs required by the Board of Trade—the whole of the hull realised only £12, which was the utmost that could be got for this ship, which had been occupied in going from the coast of Northumberland to Russia and back.

"Phineas Turner, Dover, shipwright and ship-breaker, gave evidence as follows:—I have broken up numbers of ships in the course of my time. In December of last year I purchased the *Galatea* for £12 at an auction sale, for the purpose of breaking her up. The deck was very rotten. It was covered with sheathing which was very good. Two-thirds of the deck itself was really rotten and was old. When I took off the sheathing, the spikes drew the main deck up with it. You could not walk on the original deck. Great portions of the rotten part I chucked into the sea. After we got the beams clear, and when we hove some of them out by the crane, they snapped in two by their own weight, they were so rotten. The deck-beam clamps were also that rotten they had to be dug out with a crowbar. These clamps are the main support of the deck-beams. The 'seatings' were 'dicky,' or partly rotten. A ship in a proper state would have no seatings. The 'lodging-knees' between the beams were some of them rotten. The 'ceiling,' or inner skin, was rotten from the clamps down to the 'bilge;' it was patched in places. There were 'graving pieces,' which were also repairs; and if the ship had been sound, they would not have been there. They were in the waist of the ship mostly. A shipwright who saw these things would know that they ought not to be there. The ceiling below

the 8-foot draught mark, and about 25 feet from the stern-post, was very rotten. The timber heads, from the covering-board to the extent of 2ft. 6in. or 3ft., were a great many of them very rotten. In the 'rim' there were pieces let into the ceiling. It would take at least a year, before a ship could get into that state. [A quantity of rotten wood, together with the graving pieces which had covered it over, the rotten wood or splinters that had been dug out being part of the original ceiling, was produced in Court. An iron frame or 'gudgeon,' in which the rudder worked, was also produced. It was very much worn in the eye where the rudder worked, and witness pronounced it unsafe to be used.]

"Cross-examined: Mr. Knight and Mr. Cullen were interested in the purchase of the hull. I complained that it was a very heavy job to pull the sheeting to pieces. I said I wish I had never seen the vessel, as she had been so much trouble. The trouble was not on account of the hard work we had, but because of the many questions asked about the vessel.

"Wm. George Knight (Dover) said he was part purchaser with Mr. Turner of the hull of the *Galatea*, and gave evidence which substantially corroborated that of the previous witness.

"Thomas Cook, Lloyd's surveyor, North Shields, deposed to seeing the *Galatea* at Blyth, and to noticing certain defects in the 'clamps,' and defective planks in the ceiling between decks and hold. He also observed other defects. He wrote to Messrs. Bell and Co., but received no answer. On the 2nd May he again visited the ship with the senior surveyor of the district, and without opening her out he observed still further defects. In consequence of his report the ship's character was expunged from the books.—Cross-examined: In neither examination was the vessel opened up; and he would be engaged about twenty minutes in each survey.

"Mr. Richard Joseph Reed, principal surveyor of Lloyd's Register for the port of Tyne; James Southern, sea pilot; Mr. Robert Bell, brother of defendant, and who produced the charter-party; and Wm. Thompson, able seaman, were also examined.

"John Coverdale, shipwright, Hartlepool, deposed to having

repaired the *Galatea* in December, 1877. The repairs he made were not sufficient to meet the requirements of the ship.

"Mr. Wm. Henry Turner, St. Mark's Square, London, principal shipwright surveyor for the Board of Trade, gave lengthy evidence as to the unseaworthiness of the ship.

The defendant, residing at Blyth, who is or was, so we are informed, a market gardener, and keeps a couple of hardware shops, said he never received any information about the *Galatea* being in an unseaworthy condition. He left it to Messrs. Robinson, shipbuilders and ship repairers, to do everything requisite; and the captain had everything to do with the rigging. He never interfered with him. She was insured for £700; she realised about £300 when broken up at Dover. They had had the vessel seven years, and she cost £1,050.

"Mr. E. A. Robinson, shipbuilder and repairer, Blyth, said he had orders from Mr. Bell to do whatever was required.

"Mr. W. Robinson, sailmaker, Blyth, gave similar testimony.

"Wm. Heatley, foreman with Mr. Robinson, also deposed to the general orders given by Mr. Bell for the repair of the *Galatea*. He also stated that he had known ships built of English oak to rot in four or five years. He saw nothing indicating the unseaworthiness of the vessel, or he would have reported it to Mr. Bell.

"Wm. Johnson Cullen, partner with Mr. Turner, who broke up the ship, said the *Galatea* was about as well-bolted and fastened as ever he saw a ship in his life. When the beams were pulled out there were three or four hauling at the crane, while the beam was 'blind' bolted at each end. They would break any beam. The ship was fit to go anywhere.

"Edward Robson Arthur, surveyor for American Lloyd's, said he had examined the *Galatea*, in April or May, 1877. He had not seen her since. She was a good ship. He did not believe she was in a rotten state when they broke her up. They would find wood like that produced in Court in a ship of even three years old. The wood produced was not rotten.

"Mr. James Arthur Beeching, shipbuilder, Dover, gave it as his opinion that the *Galatea* was seaworthy, and she had proved her-

self so from having come from the Baltic in the depth of winter. From her general appearance there was no immediate danger to human life.

"Cross-examined: The original deck had become rotten from the sheathing on the top having excluded the air from it.

"John Colpits, master of the *Galatea* from 1872 to 1877, said the ship had been frequently repaired during that time.

"Mr. Edge and Mr. Cave, Q.C., having addressed the jury, his Lordship summed up, reviewing the evidence on either side as to the condition of the vessel. Mr. Turner, the Board of Trade officer, he remarked, was a most important witness, the case turning on what he had said. He could not imagine that Mr. Turner had any interest one way or the other; and, therefore, it struck him that his evidence was a fair and impartial report of the whole matter. His Lordship put to the jury the following questions:—Was the ship in a seaworthy condition when she left Blyth in September, 1878? and, if not, were they satisfied that every reasonable means had been used to ensure that she was seaworthy? It was no ground of defence that the shipowner knew nothing of shipping pursuits. If he choose to profit by sending ships to sea it was his duty to inform himself upon the subject, and take proper precautions that the lives of the captain and seamen should not be endangered.—The jury retired about six o'clock, and returned to Court after an hour's absence with a verdict of not guilty.—The result was received with applause that was immediately suppressed.—Mr. Beasley asked his Lordship to inquire of the jury whether they considered the vessel seaworthy.—His Lordship replied that the jury had returned a verdict of not guilty, and he could not ask them questions.—Mr. Beasley stated that Mr. Justice Lush had done so in a previous case.—His Lordship: No one can have a stronger respect for Brother Lush than I have in every way, but I cannot see my way to taking that course.—Mr. Beasley applied for the costs of the prosecution.—His Lordship: It is quite a proper case for costs, and I make an order accordingly."

We have no desire to take exception to the decision in favour of the defendant. He was ignorant and innocent of the state of the ship, and there is no law which prevents market gardeners or

hardwaremen or any gardeners or any men from owning British ships. The charge was thoroughly tried, but the result is like that in the case of the *Arbutus*, somewhat ludicrous. The learned judge summed up with the greatest care, and as is shown above he gave the jury the following questions to answer: "Was the ship seaworthy when she left Blyth, and if not, had the defendant used every reasonable precaution to render her seaworthy?" When a judge puts questions to a jury it is only reasonable to suppose that he has a right, or thinks he has a right, to receive answers. The jury, however, did not answer the questions, but found a verdict of "not guilty." The judge in the case of the *Arbutus* laid down with very great clearness the meaning of "seaworthiness." The judge in the *Galatea* case explained with equally great clearness what is of equal value, the principle that, "if a shipowner choose to profit by sending his ship to sea, it is his duty to inform himself with respect to her and to take proper precautions for the safety of human life." In this case it was pleaded that the shipowner was a market gardener, and not a practical man, and he had taken the necessary precaution by entrusting the repairs of the ship to others.

Mr. Beasley, one of the learned counsel for the prosecution, was evidently not satisfied with the baldness of the verdict, and, as we have stated, asked his Lordship to obtain from the jury their opinion as to whether the ship was seaworthy, supporting his application by the statement that Mr. Justice Lush had done so in a previous case. Sir James declined to disturb the jury's decision, on the ground that he had not the right to pursue such a course. The *Newcastle Weekly Chronicle* points out thereupon that "The results of the trial, therefore, are these—that much public money was spent, that much eloquence and legal acumen were displayed, and that, after all, the principal question in which the public are interested, indeed *the* question, namely, was the *Galatea* seaworthy? remains as much in obscurity as ever. Undoubtedly Sir James Fitz-James Stephen had what may be sufficient ground for his refusal to question the jury, but, surely, after a precedent had been created by such an experienced and clear-headed judge as Mr. Justice Lush, it was being, to say the least, somewhat extra

legal and exact to permit what was the actual condition of the *Galatea* to remain in doubt."

Whether any rejoicing were held over the acquittal of the master of the *Arbutus* we do not know; but we learn from the *Shields Daily News* that on the return of the owner of the *Galatea* to Blyth, a reception, headed by a brass band, playing "See the Conquering Hero Comes," awaited him. We read in the *Shipping and Mercantile Gazette* that 1,500 people met in the Theatre Royal, Blyth, to congratulate him on his "victory over the Board of Trade." The meeting seems to have been spontaneous and effective; and speeches were made condemning in a very hearty way the Board and its surveyors, and their action all round. Remarks were also made, with very many of which we concur as to the unwisdom of interference with trade. The meeting terminated, and the band played "God Save the Queen." We can only ask with the great dramatist: "Doth not a meeting like this make amends?"

It would have been more satisfactory however, if the jury had decided that the *Galatea was* seaworthy; for after all, that point at least has not been cleared up; and we would ask "The Conquering Hero" and his 1,500 well-wishers, to think for one moment before they next assemble to carp at the action of the Board of Trade, and call its surveyors hard names, as they did at the meeting in the Theatre Royal, whether the *Galatea* would have ever been able to go on her last voyage, if Mr. Plimsoll had had his own way, so as to detain for strict survey all unclassed or disclassed ships. Shipowners had better think over what might have been, as well as what is. After all, and on calm reflection, the owners of soft wood ships, or old ships, or ships cracked down, must, if they have any powers of reflection at all, surely be satisfied that where the Board of Trade now interferes with one ship here and there, the Plimsoll system, which originally found so much favour in the eyes of Mr. Hall of Newcastle, and of the Blyth and Seaham people generally, might possibly have detained a score of ships right out. That a shipowner may be successful when he prosecutes the Board of Trade, is proved in the memorable case of Kain *v.* Farrer, but it is quite idle for ship-

owners to lavish abuse on "the Bishop of London and the rest of them," as Lord Coleridge described that Board, simply because the Board's officers do what the Acts of Parliament require of them. The Department is only the servant of the Legislature, the Legislature is the servant of "the free and independent elector," and the free and independent elector was the servant or slave of Mr. Plimsoll, and demanded and secured interference with British ships. It is true the Legislature did not go so far in this direction as Mr. Plimsoll wanted, but it is none the less true that the free and independent elector gave up his private judgment in the matter of "Our Seamen," and placed himself bound hand and foot to do the behest of the "Philanthropist," whilst the Board of Trade acted as moderators. As regards the two cases we have been referring to, we would ask the 1,500 to remember that the learned judge who tried one case informed the jury that the Board of Trade would have been guilty of a gross dereliction of duty if they had not prosecuted, and the judge who tried the other case marked his sense of the propriety of the prosecution by granting the costs thereof. Excepting in cases of exceptional hardship, illegal exercise of power and so forth, in which cases the shipowner has a right of action, it is folly for him to abuse the Board of Trade. It is like blaming a sword for wounding a person, or blaming Tommy Atkins the private, for incurring the Zulu war. If the Zulu war is a sin, it does not rest on Tommy Atkins. If the law which requires the detention of ships is a sin, it does not lie at the door of the executive officers of the Board of Trade, but rests with the shipowners themselves for allowing, and to a certain extent aiding and abetting an enthusiast during a wave of popular excitement. The British nation does not often go into a fit of philanthropy, but when it does so it is very unthinking and dangerous. The duty of the shipowners is now to see that the necessity for such a fit does not, so far as they are concerned, again arise, but if it comes they must meet it in calmness and in argument, and not as they did before, turn tail and show the white feather, and get abused all round and finally kicked under.

Even in the face of, we might almost say partly because of,

these two failures of State prosecutions, we prefer the existing modified "officialism" to "Plimsollism" pure and undiluted. It interferes with trade less than the other, and whatever may be its failures in one or two instances, it is founded on the correct theory of personal responsibility. Even the case of the *Galatea*, although it ended in favour of the owner—for which, seeing that he was not only ignorant and innocent, but also "not guilty," we present him with our congratulations—has obtained from one of the cleverest of judges a declaration which will bear fruit in the immediate future:—that "It is not good ground of defence to allege that the party charged knows nothing of shipping pursuits. If a person choose to make profits on ships sent to sea, it is his duty to inform himself of the subject, and to take proper precautions for the protection of the captain and seamen whose lives should not thereby be endangered. Therefore the owner's business is to see that the ship is not sent to sea in an unseaworthy state, and if it be proved that the ship is unseaworthy when sent to sea, he must take the consequences, unless he proves that he used all reasonable means to secure her being sent to sea in a seaworthy state. It is like the case of a man treating another medically, and the person treated dies. It is no use in such a case for such person when charged with manslaughter to declare that he had done his best for the man who died, and he might have done better had he known more of the use of medicine. To such a person the law lays it down that it is his business to have a common knowledge and skill in the matter, and if he caused death by not having proper care and skill, then he is liable to be convicted of the offence although he had no intention of doing any harm. The Legislature has caused shipowners who send vessels to sea in an unseaworthy state, and do not take all reasonable means in their power to make them seaworthy, to take the consequences of such neglect."

All we have contended for is that the doctrine explained by Sir James Fitz-James Stephen shall be pushed to its extremest limits. The owner of a seaworthy ship need fear nothing, and the dilatory owner need but bestir himself in time.

ON SICK SEAMEN ABROAD AND AT HOME.

REFERRING to the particulars given in the *Nautical Magazine* for July under this heading, we are now able to give our readers the following details which have been sent to us by the Medical Officers of the Liverpool Seamen's Dispensary.

This dispensary has now been in full working for two years and a-half. It was established by the Committee of the Liverpool Sailors' Home for the purpose of providing seamen with medical attendance and medicines at the lowest cost, and thus protecting them from the numerous advertising quacks who infest Liverpool as well as most large towns. Premises were secured in close proximity to the sailors' home, the services of two medical practitioners were volunteered, and all other necessary arrangements having been made, the dispensary was opened on the 26th February, 1877. Since then there has been daily attendance (with the exceptions only on Sunday, Good Friday, and Christmas day), from three to five p.m., these hours being the most convenient for the attendance of seamen. The results of the two and a-half year's working has been as follows :—

During ...	1877	...	848	patients applied.
During ...	1878	...	1,002	do.
Up till 30th June,	1879	...	460	do.
	Total	...	2,310	patients.

These numbers indicate, with few exceptions, individual patients. The number of attendances from the opening of the dispensary up till the 30th June, amounted to 6,963. The dispensary is self-supporting, each patient paying one shilling for every attendance. Those proceeding to sea, or unable to attend regularly, are supplied with extra medicines.

At the suggestion of the medical officers the practice of the dispensary has been from the first limited to venereal diseases, and the figures given above are the best proof that such limitation

was desirable. The provision made in Liverpool for the treatment of these complaints is, as elsewhere, most inadequate. The Lock Hospital has only twenty-five beds for males, which are almost always full, the majority of patients being seamen, while numbers are obliged to be refused admission, and no out-patients are seen. Again, sailors do not like attending as out-patients at a general dispensary or hospital, since it involves much waiting in the same room with women and children, not to mention other inconveniences. Hence, the Seamen's Dispensary supplied a great want, without in any way encroaching upon the work of medical charities; its self-supporting character also freeing it from the reproach which attaches to free dispensaries. But while the practice of the dispensary has been limited to a special class of diseases, other complaints, to which sailors seem specially liable, have been observed by the medical officers, to which reference will presently be made. For the present it will be desirable to confine ourselves to the effects of venereal diseases among seamen, and especially as unfitting them for duty.

As is generally well known, there are two classes of these diseases. One, "gonorrhœa," and its complications, generally local, and except, for a troublesome form of rheumatism, seldom producing any constitutional effects. It is, however, very frequently the cause of much suffering and invaliding, involving both the humanitarian and monetary considerations alluded to in the remarks in our July issue. There is also a very serious consequence of repeated attacks of this complaint, especially when neglected. We allude to what is known technically as "stricture," from which many patients suffer, and are to be seen in large numbers in the surgical wards of general hospitals. This complaint, which too often leads to the most frightful sufferings, and not unfrequently to fatal results, prevails very considerably among merchant seamen, and has been the occasion of much anxiety to ship surgeons and masters. It is not desirable to enter more minutely into details; what we have stated will be sufficiently understood.

We now pass on to the second and much more serious form of venereal disease, viz., syphilis, and its many complications,

which are, unhappily, too prevalent among seamen. We cannot illustrate the subject better than by taking a typical case. A seaman, having signed articles and received his advance note, discovers, almost on the eve of departure, that he has contracted disease. He presents himself at the dispensary and is strongly urged by the medical officers not to proceed to sea, they knowing the case to be one of syphilis and knowing also what the probable consequences will be. But all is in vain, the answer being that the patient has signed articles, received his advance note, *and must go*. Now, as is well known, syphilis almost invariably infects the patient's whole constitution, and before the unfortunate seaman has been many weeks at sea, he is in all probability a loathsome object both to himself and his fellow-seamen. That this is no exaggeration is shown by what was stated in the Report of Dr. Patterson, Superintendent of the British hospital at Galata, and noticed in the *Nautical Magazine* for July, page 562. It only confirms what he stated two years ago in a letter to Mr. N. W. Lowndes (one of the medical officers of the dispensary) :—

"I visited a small screw steamer a short time since at the request of the captain, to examine his crew. I found the steward with two large suppurating buboes of six weeks standing. The condition of the wounds and the dressings were perfectly filthy and stinking. The cook was covered with secondary syphilitic eruption and ulcerated sore throat. Two men had large syphilitic ulcerations, one with gonorrhœa. Now every man was as dirty as he well could be. All had shipped with the disease on them, and carefully concealed their state from the captain. Of course they performed their duties imperfectly, and the others of the crew as a consequence were overworked. This is only one of numerous instances of a similar character. Men are daily admitted into hospital suffering from various forms of syphilis, most frequently chronic, and in such a state of disease and dirt that anything communicable must be communicated."

One of H.B.M. Consuls, in a letter dated 25th February, 1877, writes as follows :—

"It would save H.M. Consuls much trouble and the Government a good deal of money, if shipowners insisted on the sailors

they engage being examined before signing articles. A number of men are now engaged in England suffering from syphilis, who fall sick as soon as the vessel is at sea and have to be discharged at the first port, where they are nursed and cured at Government expense, and then frequently sent home as distressed seamen. No shipping office should be allowed to engage sailors who had not been examined by a competent surgeon."

These diseases form a very considerable proportion of the cases seen at the Liverpool Seamen's Dispensary, and comprise the majority of cases admitted into the Liverpool Lock Hospital. A Select Committee of the House of Commons has recently been sitting to inquire into the operation of the Contagious Diseases Acts. Its members have been unable to conclude the inquiry this Session, and have requested to be re-appointed next Session. Should this request be granted, it is greatly to be desired that shipowners will furnish the Committee with the names of such shipmasters and other witnesses as can give reliable evidence on this matter, and show how much preventible contagious disease exists on board ships. It could be easily proved that most, if not all, of this disease is contracted from the low class of prostitutes which are to be found in Liverpool and all seaports; who, in consequence of a dread of interfering with the liberty of the subject, are permitted to infest the streets and solicit seamen in spite of the wholesome provisions of the Towns Police Consolidation Act, 10 & 11 Vict., c. 29, s. 28. This provides that, "Every common prostitute or night-walker loitering and importuning passengers for the purpose of prostitution . . . . to the obstruction, annoyance, or danger of the residents or passengers, shall be liable to a penalty not exceeding forty shillings for each offence, or in the discretion of the justice before whom convicted, may be committed to prison, there to remain for a period not exceeding fourteen days, and any constable, &c., shall take into custody without warrant, and forthwith convey before a justice any person who, within his view, commits such offence." Now, it is clear that these powers have been neglected, but it must be obvious that they cannot be adequately enforced except by a special police in plain clothes. If the women who in Liverpool, Bristol, Hull, Dublin, Greenock, Leith and other

ports where the Contagious Diseases Acts are not enforced, were subjected to the same sanitary regulations that are provided by these Acts in Portsmouth, Devonport, Cork, Southampton, Dover and other ports where they are enforced, much disease would be prevented, and the social and moral improvement both of these unfortunate women and the sailors who are subject to their pernicious influence would be considerably advanced.

Among the complaints to which sailors seem specially liable are the following:—

Rupture.—This is the result of sudden violent exertion, such as seamen are constantly liable to, especially when performing duty aloft. It would be interesting to know (if it could be ascertained) whether the new double topsails or self-reefing topsails have tended to reduce this.

Rheumatism.—Sailors are very liable to this complaint, apart from the specific form to which we have already alluded. It is much aggravated by their careless habits of sleeping in wet clothes, &c. It is liable to be followed, if neglected, by very serious and even fatal heart affections.

It is not necessary to make more than a passing allusion to scurvy, sea-boils, and other complaints to which sailors are specially liable. With the exceptions we have given, sailors may be said to enjoy very good health, and their occupation may be considered a very healthy one. In conclusion, it will be seen that most of the diseases from which sailors suffer are contracted in port, and are entirely preventible. It will also have been seen that many men are compelled to proceed to sea in an unfit state from a fear of the consequences of neglecting to do so after signing articles. Surely some voluntary organization could be arranged at sailors' homes or shipping offices, by which substitutes could be provided, the invalided sailor being left behind to undergo medical treatment. Again, the medical inspection of all seamen might be also provided for, in a voluntary arrangement made by shipowners. It would be a means of procuring a better class of men, if the former were to offer an additional half-crown per month to each seaman who should undergo medical examination by a competent surgeon. There is, undoubtedly a reasonable fear of "over-legis-

lation." But this can be averted by shipowners doing in this direction what they have done in others. Without any suggestions from the Board of Trade, or Acts of Parliament, many excellent though unwritten laws have been established among shipowners, which have tended greatly to their advantage and the safety of their ships and crews. All that is required is to recognise the existence of the great evil of allowing men to proceed to sea in an unfit state, when they must be for weeks and months without any medical attendance. Once let this fact be admitted and fairly faced and the remedy will soon suggest itself. We may also hope that since so much has been effected by the Liverpool Seamen's Dispensary, similar institutions will soon be established wherever they are likely to be useful. We cannot expect to see hospitals multiplied abroad nor provision made by foreign Governments for the cure of British sailors, unless we set the example, and ensure that from the port of departure the British sailor shall have every opportunity afforded him of sailing in a sound physical state.

THE WAGES OF DISTRESSED SEAMEN.

A POINT OF LAW.

A SOMEWHAT curious case bearing on the legal rights of seamen injured on board ship was heard before the Queen's Bench Division of the High Court of Justice, on the 28th June. The case was an appeal made by the Board of Trade against a decision given by the magistrate at the Thames Police Court, upon the hearing of a summons issued against them, at the instance of a seaman named Gustav Sundholm, for the recovery of certain wages received by them on his behalf. The following are the main facts of the dispute. In January, 1875, Sundholm signed articles and left London on board the *Crown Prince* of St. Johns, New Brunswick. The vessel was bound for Melbourne, Callao, and other ports, and had a crew of fifteen hands. Sundholm's wages were to be £5

per month, and provisions. In November, 1876, while the vessel was at sea, the whole of the crew, with the exception of one man, were taken ill with vomiting and partial paralysis—the result of eating putrid pork served out as provisions. The man who escaped was the only one who had not eaten of the pork. In January, 1877, the vessel touched at Port Stanley, in the Falkland Islands, and the crew were placed in hospital where six of them died. Sundholm, who was seriously ill, was left in hospital and remained there wholly incapacitated until August, 1877, when he was brought to England as a distressed seaman. At the time he left the *Crown Prince*, there remained due to him as wages a sum of £81 12s. 6d., and this amount was paid over to the Board of Trade by the owners of the vessel, in accordance with Sections 209 and 210 of the Merchant Shipping Act, 1854. On returning to England, Sundholm applied to the Board of Trade for this balance of wages deposited with them on his behalf; but as the expenses of his maintenance in hospital at Port Stanley, and of his passage home amounted to £102, the Board refused payment on the ground that no balance remained to his credit in their hands. And here arises the point of law on which their refusal was based.

Section 228 (Sub-section 1) of the Merchant Shipping Act, 1854, provides that when a "master or seaman receives any hurt or injury in the service of the ship," the expenses consequent thereon must be borne by the owner, and the Board of Trade, apparently acting on an opinion expressed on the point some years ago by the Law Officers of the Crown, maintained that Sundholm's illness did not constitute an "injury" received in the service of the ship, within the meaning of the Act, and that therefore he himself was liable for the expense of his own maintenance in hospital and subsequent passage home. The magistrate who heard the case at the Thames Police Court, however, declined to take this view. He held that Sundholm had been injured in health by the bad quality of some of the provisions which he was obliged to eat while in the service of the ship, and that this injury came within the meaning of Sub-section 1 of Section 228. In his opinion therefore, Sundholm was not liable for the hospital and other expenses incurred, and acting on this view he convicted the Board

by ordering them to pay a penalty of one penny, and to hand over to Sundholm the entire balance of wages (£81 12s. 6d.) without any deduction. At the same time he granted a case for an appeal in order that a superior Court might decide whether the conviction should be affirmed or quashed.

It must be observed that there was no dispute whatever as to the facts of the case. The counsel for the Board of Trade, Mr. Ravenhill, admitted that the question turned solely on the point as to whether Sundholm's illness was an "injury" within the meaning of the Act, and in endeavouring to prove that it was not he displayed a considerable amount of ability in the art of legal hair-splitting. He argued that the illness in this case was not an "injury received in the service of the ship," basing his contention apparently on the fact that Sub-section 2 of Section 228 especially provides for cases in which seamen are, "on account of any illness *temporarily* removed" from their ships, and that consequently since the Act makes a distinction between "illness" and "injury," the two cannot be legally regarded as similar terms. In further proof of this theory he pointed out that Sub-section 4 also provides for illness, but makes no mention of hurt or injury, and that in Section 229 illness, injury, and hurt, are all mentioned so that the two latter terms must not be considered as being identical with the former. He maintained that as the Act specially distinguishes "hurt or injury" from "illness" the two must be regarded as distinct.

It would be a waste of time to follow the line of legal quibbling followed by the counsel for the Board of Trade in his endeavour to obtain a new trial. From a common sense and non-legal point of view the case will bear but one interpretation, and it is satisfactory to find that the judges regarded it in this light and confirmed the magistrate's decision.

This case affords a good illustration of the haze and fog with which the legal mind is able to enshroud the simplest questions. If Sundholm had been injured by falling from the rigging in consequence of a rotten rope having given way, the owner of the vessel would undoubtedly have been called on to pay his hospital expenses. But because the owner provided him with rotten pork,

and sugar mixed with kerosine, as food, a question is raised as to his liability. Food is clearly as essential to the performance of the seaman's duty as ropes are to his working in the rigging, but the Law Officers of the Crown, at some time or other, seem to have come to the conclusion that it is not. They appear to have persuaded themselves that the food which a seaman eats on board ship is not eaten in the ship's service, and, consequently, that he might serve the ship equally well if he ate nothing. Acting on this view they advised the Board of Trade to contest the point, and Sundholm's case is the result.

It is needless to say that the decision now given is one of considerable importance for seamen. For had it been laid down that when a niggardly and unprincipled owner provides rotten and unwholesome food and the hands are laid up in hospital in consequence, the latter must bear their own hospital expenses, their position would certainly have been a most unsatisfactory one. Fortunately it is now clear as to the quarter in which the liability rests.

SIR WILLIAM ARMSTRONG'S GUNBOATS.

ON Thursday, 24th July, 1879, the Elswick firm of Sir William Armstrong & Co. placed before the Naval authorities of this and other countries the latest improvement in gunboats. The idea of which the mind of the Elswick firm has taken a tight grasp is, that a gunboat should really be as little else than a floating gun carriage, as it is possible to make her. In other respects the proposition to the mind of the firm appears to be this:—As hornet : horse : : gunboat : armour-clad. It takes from four to six hornets to sting a horse to death; from four to six of these gunboats would in like manner kill the biggest armour-clad. One or two of the offending hornets may get smashed by a horse in the encounter in which he perishes; and one or two of these gunboats may get smashed in their encounter with an ironclad, if she is properly handled; but in spite of that down must go the giant if the pigmies also are

properly handled. Their chances of being hit by the armour-clad are about equal to the chances of a hornet when attacking a horse, being swept down by his tail. The chances of the gunboats hitting the armour-clad are about equal to those of the hornet stinging the horse with effect. Regarding the special mission in life of the gunboat to be the destruction of armour-clads, the boat must be small, strong, swift, able to go a-head or a-stern with equal or nearly equal power, able to turn in a small circle. She should carry but a very small crew, as everything on board must as nearly as possible "do itself." She should be of light draft of water, so that she may run away from heavy, deep ships, and lure them into shallows. She should be able to deliver effective fire when going a-stern as well as when going a-head. Besides being all this, she should be able to protect herself if attacked by smaller craft and by boats, so that while she may with effect deal deadly blows at the largest craft, small craft, such as torpedo launches, cutters, row boats, and all "small deer," shall not be able to touch her. If as well as having the power of offence against giants and of defence against dwarfs as sketched above, the floating gun-carriage is also capable of effective service in the bombarding of forts, we think its inventors may claim to have presented the Navies of the world with as pretty and as cheap a peace-preserving machine as can well be expected for the size and for the money.

As the Royal Navy of England is not permitted to possess these powerful little craft, it was with feelings of great relief that we learnt that the happy possessors of them are to be the Chinese Government. Mr. Reed has, we believe, supplied the Japanese with their war craft, and it is possible that the Chinese and Japanese may come to blows. When they do the result will really be a battle between Sir William Armstrong and Mr. E. J. Reed, C.B., M.P. May the best man win, and then may the result be of use to the Government of Her Most Gracious Majesty in case that Government should not have seen its way in the matter at an earlier date.

With the above general remarks by way of introduction we proceed to lay before our readers a statement of what we saw for ourselves, and of tabular and other matter given to us.

First: We arrived at Waterloo Station, the new station, and shortly after arriving, the Chinese Embassy mustered in force, and in the costume of their country. His Excellency, the Marquis Tsêng, a gentleman rather below the middle height, had on a jacket or pelisse of yellow silk, the feather which depended at right angles and sternwards from a button on the top of his Excellency's head-gear, an inverted truncated flattish cone, was longer than the feather of the only other notable who wore one, and a footman, or "English Jeames" of a very fine type, wearing a European hat, with shrouds on each side from the gunwale to the top of the funnel, carried a cushion tied up in a yellow bandanna. We do not know whether this is a talisman, or whether it is supposed to represent a piece of the territory of China, but whatever it is, or is supposed to be, the duty of the bearer of it was to see that whenever his Excellency was about to be seated, the yellow bandanna and the cushion inside it, was interposed as a fender or resting-piece between the august person and the object that would otherwise have been honoured by contact. This part of the ceremony was carried out with great completeness. Another of the great notables wore outer garments of blue or purple silk, and other members, garments of various colours of a more sombre hue. All wore the Chinese boots with thick white soles, and carried English umbrellas, built on serviceable rather than elegant lines. We are particular to mention the personal appearance of the Chinese notables, as their costumes, the settled amiability of expression in their countenances, and their ways and manners, and the inevitable yellow cushion, altogether formed a striking contrast to the quiet movements of the other persons present, and seemed utterly out of place on board little greasy boxes of works, levers, guns, coal and smoke, as are these floating gun carriages, where everything is solid, workmanlike, severe and practical. Sages from an antediluvian school, permitted by some strange freak of Father Time, to connect the past and present, and see, for a few hours, the marvels achieved by steam and electricity; just about 4,000 years out of place. John Chinaman has a leeway of many centuries to make up, but from what we saw and heard the other day he knows it, and his knowing it is

more than half the battle. It is not necessary that we should occupy our space with a list of names of the official and other gentlemen who paid court to the Marquis Tsêng; suffice it to say that the Right Hon. W. H. Smith was not on board. It transpired that the seductive delights of a Cabinet Council intervened.

The *Alpha*, *Beta*, *Gamma* and *Delta* have arrived out in China. The four gunboats reviewed at Spithead recently were the *Epsilon*, *Zeta*, *Eta* and *Theta*. The sizes of these ships and their armament are fully given in the tables below. They adjusted compasses when about to leave the Tyne, the bar of which harbour they crossed about 8 p.m. on Friday, the 18th July, and proceeded for Portsmouth. Their speed during the run was eight knots. They met with a gale and anchored in the Downs on Sunday morning, where they remained until Tuesday morning. They hoisted sail after passing Beachy Head, and anchored at Spithead at 7 p.m. on the Tuesday. On their way down their qualities as sea boats were tested, and as far as we could discover, proved. Our readers are aware that about eight years ago, Mr. Geo. Rendel, of the firm of Sir William Armstrong and Co., acting on the idea that a gunboat should be a gun-carriage, in other words, that the boat should be made for the gun, designed a little vessel, called the *Staunch*. That was the fœtus or embryo out of which the complete gunboat has grown. He claimed, at that time, that for the cost of the finest ironclad he could build a dozen *Staunches*. The Admiralty took up the idea, and now have either building or built from twenty-five to thirty of them. They are all on the same plan, all of the same dimensions, and all armed with the 18-ton gun. From money pressure, or from some other cause, the plan of eight years ago is followed by the Admiralty to-day, which circumstance affords (if any illustration were wanting) an illustration of the effects of not allowing the country to avail itself fully of the energy, enterprise, and inventive genius of private engineering firms. Messrs. Armstrong made a start eight years ago. If, instead of regarding that as a final effort and perpetuating the *Staunch* of 1872, the State had been permitted to avail itself of the services of the private engineering firms, instead of thirty *Staunches*, each very excellent in its way, but still

(such are the rapid strides of private enterprise) to a certain extent antiquated, the nation might have possessed some gunboats equal to those of the Chinese. These new ones will, of course, be outstripped in a short time, and until that time arrives we can only trust that our *Staunches* will not be found insufficient, and that the *Epsilon*, *Zeta*, *Eta*, and *Theta* may not have to try conclusions with the *Audacious* or whatever other of Her Majesty's ships may be in Eastern waters. It is an ungracious thing to find fault with the great department controlling the construction of the British Navy, and it is a thing we have never condescended to do, but without doing so, we might however now suggest that instead of regarding the *Epsilon* and her gun as final efforts, the nation would be benefited by the giving to Messrs. Armstrong and Co. an order for something as much better than the *Epsilon* as that firm might be able to produce for the cost. It is not only in the designing and building of the ship, but also in the designing and fitting of the armament that such rapid strides have been made. And it is the power such a private firm possesses of designing and finishing everything, and subordinating each part to the whole that has led to the success achieved in the present case. So far as it is possible to see from the performance of these little craft on the 24th July, there is no reason why an 80-ton or a 100-ton gun might not, in a craft a little larger, take the place of the 35-ton gun of *Epsilon* if such a step were found to be necessary; but looking to the penetrative power of the *Epsilon's* gun, it is a question whether anything of much greater power will be needed to demolish most of the ironclads now afloat.

The *Alpha* and *Beta* had for their large armament a 26½ ton gun, and the *Gamma* and *Delta* a 38-ton gun of the British service pattern, capable of penetrating 19½ inches of wrought iron in three layers with teak of an aggregate of 10 inches between. The guns of those vessels were of the same size as the turret guns of the *Thunderer*. The guns in *Epsilon*, *Zeta*, *Eta*, and *Theta* are 35 ton 11-inch muzzle loaders of a new Elswick type, but their power and range are greatly in excess over the 38-ton gun, that is to say, are 15 per cent. over the powers of *Dreadnought* guns. *Epsilon's* gun burns 235 lbs. of powder, that is to say,

75 lbs. more than the guns of *Dreadnought*. *Dreadnought* has a displacement tonnage of 10,886 tons and *Epsilon* of 440 tons. The shot fired from *Epsilon's* gun has a lower and straighter line of flight, a far longer range, and therefore greater penetrating power. *Thunderer* and *Dreadnought* might both be disabled by *Epsilon* and her consorts before the latter would be within range of the guns of the former.

Besides the large gun on each of these little craft, there are two new Elswick 12 lb. breechloaders on each, capable of penetrating 4½ inches of iron, such as the *Warrior's* plating is, and also two new pattern Elswick Gatlings.

The large gun is fixed on a line with the keel, and is brought to bear on an object by manœuvring the vessel, which is a far easier operation than would be the traversing of the gun on slides. The loading, elevating, and depressing, and the running of the guns in and out, are done by hydraulic power, and can be done by a boy with one hand. The firing is by electricity. The only operation in connection with the big gun requiring manual labour is hauling the shot and powder out of the magazine below, placing it in a little truck and hauling it to the muzzle of the gun. This is the only point in which improvement is wanted. If the boats were rolling or pitching very much this hauling about of the charges on a tramway would be difficult and dangerous. The wonder, however, is not that the method of hauling up the charges and getting them to the muzzle of the gun is not better than it is, but that so much in the way of perfection has been got into so small a compass.

On the 24th July, the four boats, with *Epsilon* as the leading ship, went through a series of manœuvres to demonstrate, which they did successfully, the speed of the ships both a-head and a-stern, the small diameters of the circle in which they could turn, the power of each engine separately, the steering powers going a-stern as well as going a-head. After all this had been done the firing commenced. Of course no targets could be aimed at, but experienced officers on board the ship could see that the shots were well on the line of the imaginary things fired at. For the first shot, with half charge, the gun was elevated to five degrees, which

gives 4,500 yards. For the second shot the elevation was ten degrees, which gave a range of 7,800 yards. The shock on board was very little. Indeed some inexperienced persons standing aft could not believe that the gun on their own ship had been fired. The firing of the guns had no effect on the compasses. This is a fact well worth notice. The Gatlings were tried after the big guns, and the whole party steamed back.

One noteworthy thing in the whole day's proceedings was, that no hitch, accident, or break-down of any sort occurred. It is not often that four new vessels can be taken out together, their powers tried, and their guns and everything about them tested without being able to get up a break down of some sort amongst them. Such, however, is the goodness of the work that no *contretemps* of any sort occurred. But the most noteworthy thing of all is the evidence these gunboats and their management, and the management of their armament brings forward that the reign of the engineer has fairly commenced. The fighting of these ships does not depend on the big, burly man any longer. The days of mere physical strength are gone. The sailor in whose hands these ships will be successful is the studious, quiet man, who will not lose his head; assisted by the engineer, who will go about his work arranging the machinery and appliances just as quietly and as calmly as if in a workshop arranging a boring machine or a cutting tool. It was indeed a fact equal to volumes of argument to look on and see a man, who would probably be called a mechanical draughtsman, whose height would be about 5 feet 2 inches, whose weight would be about eight stone, with a quiet voice, and an unobtrusive manner, dressed in a civilian costume of tweed trousers and a black coat, directing, managing, checking, and instructing sailors who are to take the ships out to China. Having observed all this, our remark was, "You seem to take great interest in the work," and we received for reply, "Yes, I am in the drawing office; these things have gone through my hands amongst others, and I thought I should like to see that their last performances are right before they finally leave England." That was all. There was no boasting, no self-assertion, no observation one so often hears about "the stupid

fellows not being able to do new things right." Nothing of the sort, only a quiet, intelligent word of satisfaction, and a spirit desirous of further effort. Success seemed to be accepted as a matter of course. There seemed to be no doubt, seeing that such known and certain things as iron, steel, and mathematics are alone the factors or manageable agents to be dealt with.

TABLE I.—GUNS.

	Epsilon.	Dreadnought.
Weight of gun	35 tons ...	38 tons
Calibre	11 inches ...	12½ inches
Charge	235 lbs. ...	160 lbs.
Weight of shot	536 lbs. ...	818 lbs.
Velocity	1,925 ft. ...	1,445 ft.
Muzzle energy	13,769 tons ...	11,727 tons

TABLE II.—RANGES.

Comparison of the range tables of the service 12½ inch 38-ton gun, and the Elswick 11 inch 35-ton gun.

Distance of object. Yards.	Service 12½ inch 38-ton gun. Elevation.		Elswick 11 inch 35-ton gun. Elevation.	
	Deg.	Mins.	Deg.	Mins.
500 ...	0	44 ...	0	17
1,000 ...	1	28 ...	0	39
1,500 ...	2	18 ...	1	4
2,000 ...	3	10 ...	1	34
2,500 ...	4	6 ...	2	8
3,000 ...	5	6 ...	2	46
3,500 ...	6	6 ...	3	26
4,000 ...	7	20 ...	4	9
5,000 ...	9	25 ...	5	43

TABLE III.—COLLECTIVE DETAILS.

Particulars of four twin-screw steel gunboats carrying each one 35-ton Armstrong gun, just completed by Messrs. Sir W. G. Armstrong & Co., for the Chinese Government.

Principal Dimensions—

Length extreme, 127 feet.

,, on water line, 125 feet.

Breadth, moulded, 29 feet.

Depth, 12 feet 3 inches.

Draught of water, 9 feet 6 inches.

Displacement, about 440 tons.

Engines collective nominal horse-power, about 70, to indicate 380 horse-power.

Speed of vessels—Forwards, 10 knots per hour.

,, ,, Backwards, 9 knots ,,

Rudder at each end.

Two pairs of compound engines driving separate screw-propellers.

Engines, boilers, magazine, shell room, &c., all under water-line.

Four transverse watertight bulkheads, horizontal under-water deck over magazines, also longitudinal central bulkhead forwards of engine.

Rifle screen for the gun.

Accommodation for 27 men besides officers.

Armament consists of one 35-ton gun firing forward. The vessel being double ended, this gun may be regarded as a stern-chaser when the vessel is going backwards.

The gun is of the new Elswick type, and fires a battering charge of 235 lbs. pebble powder. The gun is worked, loaded and controlled by hydraulic power, and requires only five men.

Two 12 prs. of the new Elswick type are carried on the quarter, charge 3 lbs.

And two Gatling guns for which sockets are provided in different parts.

Tripod masts of iron.

Bunker capacity 70 tons.

Coal consumption at full speed about half-a-ton per hour.

A CONTRIBUTION FROM AN OLD FRIEND.

[The following remarks are addressed chiefly to junior officers of the merchant service, but the sound wisdom of our contributor's observations will no doubt give pleasure to many of our older subscribers.—Ed.]

BOYS now are generally "young men" ere they leave home, and the facilities for travelling are so great that they seldom remain long without re-visiting it. But perhaps some readers will remember their first return home after an absence of many years; how, if they left young, disappointed and sorrowful they felt to find all changed; houses, chapels, streets, all dwarfed, shrunk, and comparatively mean looking; the monument, the pump, the lamp, the tree, around which they formerly played; nay, even father and mother grown smaller, while still the same; for awhile they cannot realise that the change is in themselves; that while their ideas of space have grown amid other scenes, they have brought back photographed upon their memory their *childish* pictures of home.

Is it a feeling something analogous to this that causes the "old sea fencibles" of each passing generation to mourn over the degeneracy of their successors? To teach by inference that when they are "called aloft" the glory will depart from their profession; that the only "complete epitomes" of nautical skill and courage will be sown up in their hammocks or buried in their coffins?

Do they, forgetting the time when their utmost ambition was to "raise a mouse on a mainstay;" when their ideas of excellence in a sailor grew in proportion to the size of his quid, the tarry state of his hands, or the number and brilliancy of the mermaids, ships, anchors, &c., tatooed on his person; when the "Flying Dutchman" and the "Mary Dunn, of Dover," were not (to them) phantom ships; I say, do they expect that the young men have grown wise and skilful to suit their enlarged ideas?

This, Sir, is a question I often put to myself, but cannot get a satisfactory answer. For while this feeling, with a mixture of

cynicism, will account for much that is said of the degeneracy of our young brothers; while the alteration in the construction of our vessels, mode of propulsion, &c., will account in a great measure for the different *form* of the practical education required of them, I hardly know how to account for the evident desire evinced by some of our successors to shirk the practical education (avoid work) as much as possible, trying perhaps to make up the deficiency by acquiring a little extra knowledge of the scientific branch of their profession. But I hope my youthful brethen will appreciate the force of my statement when I say that no scientific attainment can supply the lack of practical skill, and that it is folly to cultivate the one at the expense of the other.

Already too much importance is by many attached to the possession of a Board of Trade Certificate of Competency, and young men act as if the certificate *entitled* them to a situation, instead of regarding it merely as a license to compete for one, and striving diligently to cultivate those qualities which will establish their character as careful, industrious, energetic officers, thus making their services *valuable* to employers and ensuring their speedy promotion and constant employment.

It is with the hope of assisting them to form a more truthful estimate of the relative values of certificates, references, and practical skill that I write. Not to try and teach them the practical part of their profession, which the very name implies can *only* be learnt by practice, but to draw their thoughtful attention to, it may be threadbare truths and well known facts, but truths and facts which are not always early learnt, and the importance of which is apt to be overlooked by young men.

"A rolling stone gathers no moss," and though there may be cases where it is advisable for a young man to change his employ, as for instance where there is no chance of promotion, yet one good reference for a long term of service, is of more value than half-a-dozen for single voyages, for these latter may certify that a man is unstable and dissatisfied, or that so many commanders have come to the conclusion that his services are not worth retaining.

Some men act as if a good character were their birthright. It may be so; and they may find people to discount it, but too

often their right is bartered for the veriest semblance of a "mess of potage."

Shakespeare has it: "He that filches from me my good name, robs me of that which not enriches him, and makes me poor indeed." But I am tempted to think that as we alone can acquire a good name, we alone can rob ourselves of it. A good name (character) is not something tangible, like a certificate or reference, it represents the state (healthy or otherwise) of the thinking "immortal part" of man, which every act and every thought has tended to form for good or evil.

Happy he who *early* learns to value a good character beyond all earthly riches. A good character can no more be filched from us than can a good temper, or unfortunately a bad one. It is true we may be calumniated, but mere accusation will not filch from us our knowledge or diligence. Knowing this, how necessary it becomes to divest ourselves of all preconceived notions that make our character dependent upon the caprice of our fellow men, and to cultivate a liberal comprehensive view of those duties, upon the conscientious performance of which our character, or good name, really depends.

In regard to these duties I may perhaps be able to assist the reader, and, for convenience sake, will address him as chief mate of a sailing vessel. Take no brother officer as a model; do not be satisfied with mediocrity, or you will never attain even that; strive to *excel*, and you will not only obtain promotion, but the better and more lasting reward of finding pleasure in the performance of duties that now are irksome to you. But do not mistake; you never will attain perfection. The more you learn the more you will feel the necessity for learning, and realising your own comparative ignorance, and the sooner you will acquire a more truthful estimate of "duty."

A seaman's duty cannot be defined in words. You sign a contract to be "at *all times* diligent in your respective duties," and yet it is possible that you draw an arbitrary line, and say, "This time belongs to my employer, and this to myself." If so, be sure your selfishness will bring its own punishment; and though you may acquire well-worded "testimonials," you will not acquire the

qualities (perseverance, &c.) that lead to success. The truth is, there really is no time, after having joined a vessel, that you can cast off the responsibility of caring for her safety; nor can you let the owner's interest suffer without injuring *your own*. One act of forgetfulness or neglect on your part will often involve your employers in much expense. See, then, yourself to all the little but important details that a careless man would depute to others. See that your ship is SAFELY moored. Use chain hawsers where practicable; they are for mooring the ship, and are often left lying idle, while your rope hawsers, which are for *transporting* ship, get unduly worn in consequence. Great care should always be taken to protect the latter from chafing. Do not allow small lines to be used where there is any doubt of their efficiency. Be careful to have boom irons, bumkins, and anything likely to cause damage, removed or rigged in. Be careful that your gangway is perfectly safe; accidents happen for want of due care in this respect, and they might lead to claims for compensation. Do not confine your duties to those of a "tally clerk" while taking in cargo, but, while careful to attend to that important part of it, you will be able (previous to commencing) to arrange with your subordinates to carry on other necessary work, and can generally manage to see that they do so. Give no clean receipt for any cargo or stores that is not in good condition and actually *on board* your ship. Be particular in loading a general cargo, for carmen, lightermen, and others sometimes break or broach packages, and any oversight on your part may have to be paid for by the ship. If a package has been repaired, it should be so marked on the receipt (the master signs bills of lading corresponding with the receipts you give). You will find that the lightermen, &c., will not take a receipt with any general remark, such as "A few slightly broken," or "Packages more or less damaged." If they cannot persuade (or frighten) you to give them a "clean receipt" they will insist upon having the nature and extent of the damage particularised, and each package to stand upon its own merits. And you cannot do better than to follow their example in this when you discharge your cargo. The ship is not responsible for defective packing, and therefore

remarks such as "stained with contents," or "contents loose," would not render the ship liable, provided the packages bore no marks of violence. Remarks such as "renailed," "repaired," "slightly broken," or "damaged," makes the ship liable for any breakage or pilferage that may take place *after* the package is delivered over side, and should be guarded against, especially with wines and spirits, fruits, &c. The best way to do this is by keeping all small cases, &c., that are not in perfect order, in a spare store room, and having them opened in the presence of the consignee or his agent. Of course you will be equally careful to see that they are not ullaged on board the ship. The carrier who habitually damaged the parcels committed to his care would soon get none to carry, and you are performing a very essential part of your duty when taking all possible care that your cargoes are delivered in "good order and condition."

The ship's "character" like your own depends upon the manner in which she *performs* the duties required of her. See then that the hold is kept clean and dry; it is not at any time advisable to wash a ship's hold, but it should *never* be done with salt water in an iron vessel; with a wooden vessel with rock salt in her timbers this would not be so objectionable. Allow no stores of tar, naphtha, turps, &c., to be stowed where it may affect the cargo. The ship and cargo is insured against accident over which you have no control, but it is evident that damage arising from insufficient dunnage, carelessly or insufficiently secured hatches, ports, or ventilators, leakage from ship's stores, &c., could have been prevented, and would make owners liable. But while careful to have your dunnage up to Lloyd's requirement, it is not necessary to exceed it when carrying light cargoes or you will shut out freight. The same reason will prevent you carrying superfluous dunnage, broken spars, stores, &c. Vessels have been known to bring home from India enough coals to last them another voyage, whereby in addition to loss of outward freight, they shut out ten to twenty tons of rice at £4 or £5 per ton. To say nothing of the principle involved, has the owner's interest been forwarded by the transaction?

Be careful in keeping your log, and adhere strictly to the truth

in your entries, wording them so that there can be no mistake; as for instance, making an entry that, "Written notice was given to merchant that ship is ready to receive cargo," and continuing *afterwards* to state that your crew were employed "getting the hold *ready for* cargo," would lead impartial people (in questions of demurrage) to decide that the notice was given too soon, although part of the hold might have been perfectly ready.

The mate of a vessel discharging rice, on the Continent, continued making daily entries that, "Pumps, hatches, and ventilators were carefully attended to," when the ground tier of bags were found partly submerged in the freshwater in which the vessel was laying. And the log of another vessel, which through "stress of weather" had damaged so much cargo as to necessitate the extension of protest, spoke only of "Fine weather," "Do. weather," and utterly failed to show when, where, and how the ship had been unduly strained by "perils of sea." Without being prolix, this should always be made to appear. See that you copy correctly *all* the data from which your daily position is found, variation, deviation, leeway, drift, current, &c. Make it a rule to find the ship's position by observations yourself, thus checking, not copying, the commander's calculations: time can always be found for doing this, and you will soon cease to find it a task. Do not neglect to note the depth of water, scope of cable, and position by cross bearings after anchoring.

To a nautical reader, a ship's log book is a vane, pointing correctly to the character (not mere reputation) of its keeper. Employers often consult it before promoting a chief officer, and I have known young men "turned back" because of its being carelessly kept.

We have an old rhyme on our north country beer (or water) jugs, to the following effect:—

"When first I was a foremast-man I often did pretend
That, if ever I got promoted, I would be a seaman's friend:
When in a little time I got promoted to a mate,
I then, like all others, soon forgot my former state.
When I became a captain I thought myself a king,
And very soon I did forget the foremast-man I'd been."

Having such good authority, you will not be offended if I suppose you to be "like all others," and earnestly exhort you to cultivate "the happy medium" between an arrogant, supercilious manner and the "familiarity that breeds contempt;" between the new-broomish tendency of unnecessarily harassing your men, and the slavish dread that would lead you to neglect your duty for fear of their grumbling.

You know the importance of beginning right; upon it the comfort and success of the voyage, in a great measure, depends. At no subsequent time will so much forbearance and tact be required of you. Strange men, meeting in a strange ship (it may be at night), all more or less under the influence of liquor, all more or less imbued with the spirit I am trying to deprecate, *i.e.*, a fear that too much *work* should be exacted from them. Some, it may be, watching for an excuse to refuse duty and delay the ship, which, in any case, means loss to your employer. Captain irritable, pilot unreasonable, junior officers incapable, yourself worried and overworked, perhaps sad at parting with your dear ones, all unite in giving you an opportunity of achieving a great moral victory over self, and thus proving that you are competent to command others. And you will find that *leading* young men, setting them an example of cheerful alacrity, will gain from them a more respectful and prompt obedience than angry orders enforced by oaths; and any little concession you may be constrained to make at the outset, will be gradually but surely rectified by persistently continuing to set them an *example* of the conduct and qualities you expect and wish from them.

A little boy once told his father that he wished he were a man, because *then* he would not have to say his prayers; in like manner I am afraid many of our young men desire to become officers that they may not have to work. No greater mistake can be made than to teach or learn that work in an officer is derogatory, and that by setting an example of industry he loses the respect of his subordinates. It is true that if he neglects his multifarious and important duties and confines his attention solely to a comparatively unimportant task (which one of his crew could perform equally well), he is injuring his employers interest and his own.

But a good officer is able, willing, and prompt to show (in fitting season) a man how to quickly and neatly execute any task he appears unequal to. He keeps himself continually employed and knows that work, occupation, employment, call it what you will, is a blessing, not a curse, and that the man is happiest who has least time unoccupied to think of self. And by occupation (or work) I do not necessarily mean manual labour, for the officer who works more with his brain will have least occasion to use his hands.

A SUNDERLAND (COAL) TAR.

(To be continued.)

JAPAN.—PILOT REGULATIONS.

The following Pilot Regulations have been issued by the Japanese Government, and are published for the general information of mariners:—

Articles I. to XII. treat of the age, qualification, manner of examination, and appointment of candidates, their responsibility to the Government, &c., &c. Article III. contains a division of the Japanese Empire into pilot districts, &c.; but the following paragraphs only affect the commanders of vessels visiting Japanese ports or having occasion to employ a licensed pilot for foreign-built ships within Japanese waters.

Art. XIII.—Foreigners who shall obtain license to act as pilots under these rules shall have special permission, while engaged in this business, to land on any part of the coast of the Empire of Japan, and to return to the place from which they departed by land.

Art. XIV.—In the pilot districts mentioned in Article III., unlicensed pilots, when engaged in piloting vessels within Japanese waters, shall always surrender the work to licensed pilots when asked or signaled by such licensed pilots to do so. Those who refuse to do so, or who feign to be licensed pilots, or use a forged license, shall be liable to a fine of not more than fifty (50) yen.

Art. XV.—The pilot fees fixed in the annexed table are not to be exceeded. For places not therein mentioned the fees are to be fixed, according to the distance, by fair contract between the captain and the pilot.

Art. XVI.—When two or more licensed pilots ask to pilot a vessel, or signal to do so, at the same time, the one first on board shall pilot the vessel and obtain the fee.

Art. XVII.—Pilot-boats, used only for this purpose by licensed pilots, shall be made as directed in Sections 1 and 2 of Article XIX., and shall be licensed by the Department of the Interior, upon request and after inspection. This license, like that of a pilot, is good for one year. Renewal is to be requested every year.

Art. XVIII.—Licensed pilot-boats, when used for the sole purpose of conducting vessels in the pilot districts where license was obtained, shall be exempted from all port, bay, tonnage, or light-house dues.

Art. XIX.—All pilot-boats shall be distinguished in the following manner:

1st. The outside shall be all painted black.

2d. The words "Licensed pilot-boat" and the number shall be clearly written in Japanese and Roman letters on the stern of the boat and on the upper part of the large sail.

3d. When licensed pilots are on board a licensed pilot-boat a pilot-flag shall be displayed from sunrise until sunset, on the mast, at the prow of the boat, on a flag-staff or some other place where it can be easily seen. Such flag must conform to the description given in notification No. 1, of the Navy Department, of date of the 1st month of the 10th year of Meiji (January, 1877).

4th. A licensed pilot-boat containing licensed pilots, both when at anchor at its station or when moving about, shall display a white, bright light at the top of its mast, where it may be easily seen from all points on the horizon during the night, from sunset until sunrise; and shall discharge flashing lights every fifteen minutes; and at all other times shall display the ordinary side-lights in the same manner as sailing vessels.

Art. XX.—When in the day-time the following signals are

displayed, they shall be regarded as indicating that a pilot is wanted:

1st. The ship's "jack" or the National flag hoisted on the foremast.

2d. Hoisting and showing the international pilot-signal letters **P. T.**

When the following signals are made at night, either simultaneously or at different times, they shall be regarded as indicating that a pilot is wanted:

1st. The display of a green light every fifteen minutes.

2d. The display of a clear white light, after short intervals of about a minute each, at the side of the upper deck.

Art. XXI.—A copy of these rules shall be furnished to each licensed pilot along with his license; hence, when the proper officials or employer requests permission to examine his documents, he shall exhibit them at once. If he refuses to do so, he shall be restrained from acting as a pilot by the Department of the Interior, or have his license taken away.

Art. XXII.—This license shall not be lent or given to another. If so lent or given the holder shall be deprived of it by the Department of the Interior.

Art. XXIII.—When, in the opinion of the Department of the Interior, a licensed pilot is unable to perform his work, or is a drunkard or negligent, or without good reason fails to discharge his duties, said Department shall instruct an officer to investigate the case, and, according to the finding, shall restrain him from the exercise of his duties, or take away his license.

TABLE OF PILOT FEES.

1. For the bay of Tokio, for sail-vessels and steamers:
   From Shanghai to Yokohama, 3 yen per foot.
   From Yokohama to Shanghai, 3 yen per foot.
   From Shanghai to Shinagawa anchorage, 4 yen per foot.
   From Shinagawa anchorage to Shanghai, 4 yen per foot.
   From Yokohama to Shinagawa anchorage, 25 yen per trip.
   From Shinagawa anchorage to Yokohama, 25 yen per trip.
   From Yokohama to Yokoska, 25 yen per trip.

From Yokoska to Yokohama, 25 yen per trip.

From Yokoska to Shinagawa anchorage, 40 yen per trip.

From Shinagawa anchorage to Yokoska, 40 yen per trip.

2. For the "straits of Kishu" and "Idzumnuda:"

From Shanghai to Hiogo, Kobe, or Osaka anchorage, 3 yen per foot.

From Hiogo, Kobe, or Osaka anchorage to Shanghai, 3 yen per foot.

From Hiogo or Kobe to Osaka anchorage, 1½ yen per foot.

From Osaka anchorage to Hiogo or Kobe, 1½ yen per foot.

From Osaka anchorage, *via* Kobe, to "Shanghai," 4 yen per foot.

3. The port of Nagasaki:

From Shanghai to Nagasaki, 2 yen per foot.

From Nagasaki to Shanghai, 1½ yen per foot.

4. The straits of Sugaru:

From Shanghai to Hakodate or Aomori (Awomori) anchorage, 2½ yen for sail-vessels and 2 yen for steamers.

From Hakodate or Aomori (Awomori) anchorage to Shanghai, 2½ yen per foot for sail-vessels and 2 yen per foot for steamers.

5. The Inland sea:

From the bay of Tokio to Hiogo, Kobe, Osaka, or from Hiogo, Kobe, or Osaka, to Tokio bay; also from Hiogo, Kobe, and Osaka, to Shimonoseki or Nagasaki, or from Shimonoseki or Nagasaki to Hiogo, Kobe, or Osaka, as follows, for sail-vessels:

Vessels of 300 tons and under, 80 yen per trip.

From 300 to 550 tons, 100 yen per trip.

From 550 to 750 tons, 125 yen per trip.

From 750 to 1,000 tons, 135 yen per trip.

1,000 tons and upwards, 150 yen per trip.

From Tokio bay direct to Shimonoseki or Nagasaki, or from Shimonoseki or Nagasaki direct to Tokio bay, as follows:

Vessels of 300 tons and under, 120 yen per trip.

Vessels from 300 to 550 tons, 150 yen per trip.

Vessels from 550 to 750 tons, 180 yen per trip.

Vessels from 750 to 1,000 tons, 200 yen per trip.

Vessels of 1,000 tons and upwards, 225 yen per trip.

From Tokio bay, *via* Kobe or Osaka, to Shimonoseki or Nagasaki, or from Shimonoseki or Nagasaki, *via* Kobe or Osaka, to Tokio bay as follows:

Vessels of 300 tons and under, 140 yen per trip.

Vessels from 300 to 550 tons, 175 yen per trip.

Vessels from 550 to 750 tons, 210 yen per trip.

Vessels from 750 to 1,000 tons, 230 yen per trip.

Vessels of 1,000 tons and upwards, 260 yen per trip.

From Tokio bay to Hiogo, Kobe, or Osaka, 6 yen per foot.

From Hiogo, Kobe, or Osaka, to Tokio bay, 6 yen per foot.

From Tokio bay direct to Nagasaki, 9 yen per foot.

From Nagasaki direct to Tokio bay, 9 yen per foot.

From Tokio bay, *via* Kobe or Hiogo, to Nagasaki, 12 yen per foot.

From Nagasaki, *via* Kobe or Hiogo, to Tokio bay, 12 yen per foot.

From Hiogo, Kobe, or Osaka, to the outside of the straits of Shimonoseki or to Nagasaki, 6 yen per foot.

From the outside of the straits of Shimonoseki, or from Nagasaki to Hiogo, Kobe, or Osaka, 6 yen per foot.

The water-mark or foot mentioned above is the highest water-mark of the vessel.

All vessels, whether steam or sail-vessels, that are anchored or fastened under the direction of a pilot, shall pay for such anchorage—those of 300 tons and under, 10 yen and those of more than 300 tons, at the rate of 1 yen per foot.

The inland sea pilot fees mentioned and fixed in the table above include the expenses of the pilot while returning home.

Inland sea pilot fees not specified in this table are to be fixed by arrangement between the captain of the vessel and the pilot.

TIDE TABLES FOR SEPTEMBER, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M. H. M.	London Bridge. P.M. H. M.	Hull. A.M. H. M.	Hull. P.M. H. M.	North Shields. A.M. H. M.	North Shields. P.M. H. M.	Leith. A.M. H. M.	Leith. P.M. H. M.	Devonport. A.M. H. M.	Devonport. P.M. H. M.	Dover. A.M. H. M.	Dover. P.M. H. M.
M	1	2 9	2 26	6 39	6 57	3 32	3 49	2 30	2 46	5 50	6 9	11 21	11 40
Tu	2	2 43	3 0	7 14	7 31	4 6	4 22	3 2	3 18	6 27	6 43	11 58	—
W	3	3 16	3 33	7 47	8 3	4 38	4 54	3 34	3 50	6 58	7 12	0 15	0 32
Th	4	3 49	4 5	8 18	8 33	5 10	5 26	4 6	4 22	7 25	7 38	0 49	1 6
F	5	4 21	4 35	8 48	9 3	5 42	5 58	4 37	4 52	7 52	8 6	1 22	1 38
S	6	4 49	5 4	9 19	9 35	6 14	6 30	5 8	5 25	8 20	8 34	1 54	2 11
S	7	5 19	5 36	9 52	10 11	6 48	7 8	5 44	6 4	8 48	9 2	2 28	2 46
M	8	5 55	6 16	10 31	10 57	7 30	7 55	6 25	6 49	9 19	9 38	3 4	3 24
Tu	9	6 39	7 5	11 29	—	8 26	9 2	7 19	7 54	10 3	10 32	3 48	4 16
W	10	7 37	8 14	0 5	0 45	9 44	10 27	8 36	9 21	11 8	11 52	4 50	5 27
Th	11	8 59	9 48	1 25	2 5	11 11	11 53	10 5	10 46	—	0 39	6 8	6 51
F	12	10 32	11 12	2 45	3 25	—	0 31	11 24	11 57	1 26	2 10	7 34	8 10
S	13	11 46	—	4 0	4 27	1 2	1 28	—	0 22	2 48	3 23	8 39	9 4
S	14	0 15	0 38	4 50	5 10	1 49	2 10	0 43	1 4	3 51	4 15	9 27	9 48
M	15	0 59	1 19	5 30	5 49	2 28	2 46	1 24	1 43	4 38	5 1	10 9	10 30
Tu	16	1 39	1 58	6 8	6 27	3 3	3 21	2 1	2 19	5 22	5 43	10 51	11 11
W	17	2 16	2 34	6 46	7 5	3 39	3 57	2 37	2 55	6 4	6 24	11 31	11 54
Th	18	2 53	3 12	7 25	7 45	4 17	4 37	3 13	3 33	6 44	7 3	—	0 15
F	19	3 32	3 52	8 5	8 25	4 57	5 19	3 53	4 13	7 22	7 41	0 36	0 58
S	20	4 13	4 34	8 46	9 8	5 41	6 3	4 35	4 57	8 0	8 20	1 20	1 42
S	21	4 54	5 16	9 30	9 53	6 25	6 49	5 20	5 45	8 40	9 1	2 5	2 29
M	22	5 40	6 7	10 18	10 50	7 16	7 48	6 13	6 44	9 22	9 46	2 53	3 19
Tu	23	6 35	7 5	11 28	—	8 25	9 7	7 20	8 2	10 16	10 51	3 50	4 24
W	24	7 42	8 27	0 11	0 55	9 55	10 42	8 49	9 37	11 34	—	5 0	5 41
Th	25	9 16	10 5	1 39	2 23	11 29	—	10 22	11 2	0 21	1 8	6 26	7 10
F	26	10 47	11 24	3 3	3 58	0 9	0 42	11 36	—	1 52	2 31	7 48	8 21
S	27	11 56	—	4 9	4 36	1 11	1 35	0 5	0 29	3 7	3 35	8 48	9 13
S	28	0 24	0 47	4 58	5 16	1 57	2 16	0 51	1 11	4 1	4 23	9 34	9 54
M	29	1 8	1 27	5 34	5 52	2 33	2 49	1 29	1 46	4 44	5 4	10 13	10 32
Tu	30	1 45	2 1	6 10	6 27	3 4	3 19	2 2	2 18	5 21	5 38	10 50	11 8

Week Day.	Month Day.	Weston-super-Mare. A.M. H. M.	Weston-super-Mare. P.M. H. M.	Liverpool. A.M. H. M.	Liverpool. P.M. H. M.	Greenock. A.M. H. M.	Greenock. P.M. H. M.	Queenstown. A.M. H. M.	Queenstown. P.M. H. M.	Kingstown. A.M. H. M.	Kingstown. P.M. H. M.	Londonderry. A.M. H. M.	Londonderry. P.M. H. M.	Brest. A.M. H. M.	Brest. P.M. H. M.
M	1	7 2	7 20	11 28	11 46	—	0 16	5 8	5 26	11 17	11 34	8 10	8 25	3 54	4 11
Tu	2	7 37	7 53	—	0 3	0 34	0 51	5 44	6 1	11 51	—	8 40	8 55	4 27	4 43
W	3	8 9	8 23	0 19	0 35	1 8	1 24	6 17	6 32	0 8	0 24	9 10	9 24	4 59	5 14
Th	4	8 37	8 51	0 51	1 6	1 39	1 54	6 47	7 2	0 40	0 55	9 38	9 52	5 28	5 42
F	5	9 5	9 19	1 20	1 34	2 9	2 24	7 17	7 32	1 11	1 27	10 6	10 22	5 57	6 13
S	6	9 33	9 47	1 49	2 5	2 39	2 54	7 47	8 3	1 43	1 59	10 38	10 58	6 29	6 46
S	7	10 1	10 15	2 21	2 38	3 10	3 28	8 19	8 36	2 18	2 37	11 21	11 46	7 5	7 24
M	8	10 31	10 55	2 57	3 19	3 46	4 7	8 56	9 20	2 57	3 21	—	0 18	7 46	8 12
Tu	9	11 25	—	3 47	4 19	4 33	5 4	9 48	10 25	3 51	4 25	0 55	1 35	8 42	9 20
W	10	0 1	0 41	5 0	5 46	5 41	6 22	11 7	11 52	5 5	5 45	2 20	3 4	10 4	10 52
Th	11	1 27	2 11	6 36	7 21	7 7	7 50	—	0 36	6 26	7 7	3 45	4 22	11 37	—
F	12	2 55	3 35	8 0	8 33	8 31	9 7	1 19	1 57	7 45	8 20	4 55	5 21	0 18	0 55
S	13	4 9	4 38	8 59	9 23	9 38	10 3	2 28	2 54	8 49	9 15	5 43	6 4	1 24	1 47
S	14	5 5	5 28	9 44	10 3	10 24	10 45	3 18	3 39	9 38	9 57	6 24	6 44	2 9	2 28
M	15	5 51	6 12	10 22	10 41	11 6	11 27	4 0	4 20	10 15	10 32	7 4	7 24	2 47	3 6
Tu	16	6 33	6 53	10 59	11 18	11 47	—	4 40	4 59	10 49	11 7	7 43	8 0	3 25	3 44
W	17	7 13	7 33	11 37	11 57	0 7	0 27	5 19	5 39	11 25	11 45	8 17	8 35	4 3	4 22
Th	18	7 52	8 11	—	0 17	0 47	1 7	5 59	6 19	—	0 5	8 53	9 11	4 41	5 0
F	19	8 30	8 49	0 37	0 57	1 27	1 47	6 39	7 0	0 26	0 47	9 31	9 51	5 21	5 42
S	20	9 8	9 28	1 17	1 38	2 8	2 29	7 21	7 42	1 9	1 31	10 11	10 33	6 3	6 24
S	21	9 48	10 8	2 0	2 22	2 50	3 11	8 4	8 26	1 54	2 19	10 59	11 31	6 47	7 12
M	22	10 28	10 55	2 46	3 13	3 35	4 2	8 52	9 20	2 45	3 15	—	0 9	7 40	8 12
Tu	23	11 29	—	3 46	4 25	4 33	5 9	9 55	10 36	3 50	4 31	0 53	1 42	8 49	9 32
W	24	0 11	0 57	5 13	6 4	5 51	6 37	11 23	—	5 15	5 59	2 32	3 18	10 21	11 11
Th	25	1 46	2 31	6 54	7 37	7 25	8 8	0 11	0 55	6 43	7 23	4 0	4 35	11 56	—
F	26	3 11	3 48	8 14	8 43	8 45	9 18	1 35	2 9	7 58	8 30	5 8	5 27	0 33	1 5
S	27	4 21	4 50	9 9	9 31	9 46	10 11	2 38	3 4	8 59	9 24	5 49	6 11	1 33	1 56
S	28	5 14	5 35	9 50	10 7	10 31	10 51	3 25	3 45	9 45	10 2	6 31	6 50	2 16	2 33
M	29	5 55	6 14	10 24	10 41	11 10	11 28	4 4	4 21	10 18	10 33	7 8	7 25	2 50	3 7
Tu	30	6 32	6 49	10 58	11 15	11 46	—	4 38	4 55	10 48	11 3	7 41	7 56	3 24	3 40

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Heligoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

TIDE TABLES FOR SEPTEMBER, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields A.M.	North Shields P.M.	Leith. A.M.	Leith. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
M	1	2 9	2 26	6 39	6 57	3 32	3 49	2 30	2 46
Tu	2	2 43	3 0	7 14	7 31	4 6	4 22	3 2	3 18
W	3	3 16	3 33	7 47	8 3	4 38	4 54	3 34	3 50
Th	4	3 49	4 5	8 18	8 33	5 10	5 26	4 6	4 22
F	5	4 21	4 35	8 48	9 3	5 42	5 58	4 37	4 52
S	6	4 49	5 4	9 19	9 35	6 14	6 30	5 8	5 25
S	7	5 19	5 36	9 52	10 11	6 48	7 8	5 44	6 4
M	8	5 55	6 16	10 31	10 57	7 30	7 55	6 25	6 49
Tu	9	6 39	7 5	11 29	—	8 26	9 2	7 19	7 54
W	10	7 37	8 14	0 5	0 45	9 41	10 27	8 36	9 21
Th	11	8 59	9 48	1 25	2 5	11 11	11 58	10 5	10 46
F	12	10 32	11 12	2 45	3 25	—	0 31	11 24	11 57
S	13	11 46	—	4 0	4 27	1 2	1 28	—	0 22
S	14	0 15	0 38	4 50	5 10	1 49	2 10	0 43	1 4
M	15	0 59	1 19	5 30	5 49	2 28	2 46	1 24	1 43
Tu	16	1 39	1 58	6 8	6 27	3 3	3 21	2 1	2 19
W	17	2 16	2 34	6 46	7 6	3 39	3 57	2 37	2 55
Th	18	2 53	3 12	7 25	7 45	4 17	4 37	3 13	3 33
F	19	3 32	3 52	8 5	8 25	4 57	5 19	3 53	4 13
S	20	4 13	4 34	8 46	9 8	5 41	6 3	4 35	4 57
S	21	4 54	5 16	9 30	9 53	6 25	6 49	5 20	5 45
M	22	5 40	6 7	10 18	10 50	7 16	7 48	6 15	6 44
Tu	23	6 35	7 0	11 28	—	8 25	9 7	7 20	8 2
W	24	7 42	8 27	0 11	0 55	9 55	10 42	8 49	9 37
Th	25	9 16	10 6	1 39	2 23	11 20	—	10 22	11 2
F	26	10 47	11 24	3 8	3 58	0 9	0 42	11 36	—
S	27	11 56	—	4 9	4 36	1 11	1 35	0 5	0 20
S	28	0 24	0 47	4 58	5 16	1 57	2 16	0 51	1 11
M	29	1 8	1 27	5 31	5 52	2 33	2 49	1 29	1 46
Tu	30	1 45	2 1	6 10	6 27	3 4	3 19	2 2	2 18

Week Day.	Month Day.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
M	1	5 50	6 9	11 21	11 40	7 2	7 20	11 28	11 46	—	0 16
Tu	2	6 27	6 43	11 58	—	7 37	7 53	—	0 8	0 34	0 51
W	3	6 58	7 12	0 15	0 32	8 9	8 23	0 19	0 35	1 8	1 21
Th	4	7 25	7 38	0 49	1 6	8 37	8 51	0 51	1 6	1 39	1 54
F	5	7 52	8 6	1 22	1 38	9 5	9 19	1 20	1 34	2 9	2 24
S	6	8 20	8 34	1 54	2 11	9 33	9 47	1 49	2 5	2 39	2 54
S	7	8 48	9 2	2 28	2 46	10 1	10 15	2 21	2 38	3 10	3 28
M	8	9 19	9 38	3 4	3 24	10 31	10 55	2 57	3 19	3 46	4 7
Tu	9	10 3	10 32	3 48	4 16	11 25	—	3 47	4 19	4 33	5 4
W	10	11 8	11 52	4 50	5 27	0 1	0 41	5 0	5 46	5 41	6 22
Th	11	—	0 39	6 8	6 51	1 27	2 11	6 36	7 21	7 7	7 50
F	12	1 26	2 10	7 31	8 10	2 55	3 35	8 0	8 33	8 31	9 7
S	13	2 48	3 23	8 39	9 4	4 9	4 38	8 59	9 23	9 38	10 8
S	14	3 51	4 15	9 27	9 48	5 5	5 28	9 44	10 8	10 24	10 45
M	15	4 38	5 1	10 9	10 30	5 51	6 12	10 22	10 41	11 6	11 27
Tu	16	5 22	5 43	10 51	11 11	6 33	6 53	10 59	11 18	11 47	—
W	17	6 4	6 24	11 31	11 54	7 13	7 33	11 37	11 57	0 7	0 27
Th	18	6 44	7 3	—	0 15	7 52	8 11	—	0 17	0 47	1 7
F	19	7 22	7 41	0 36	0 58	8 30	8 49	0 37	0 57	1 27	1 47
S	20	8 0	8 20	1 20	1 42	9 8	9 28	1 17	1 38	2 8	2 29
S	21	8 40	9 1	2 5	2 29	9 48	10 8	2 0	2 22	2 50	3 11
M	22	9 22	9 46	2 53	3 19	10 28	10 55	2 46	3 13	3 35	4 2
Tu	23	10 16	10 51	3 50	4 2	11 29	—	3 46	4 25	4 33	5 9
W	24	11 34	—	5 0	5 11	0 11	0 57	5 18	6 4	5 51	6 37
Th	25	0 21	1 8	6 26	7 10	1 46	2 31	6 54	7 37	7 25	8 8
F	26	1 52	2 31	7 48	8 21	3 11	3 48	8 14	8 49	8 45	9 18
S	27	3 7	3 35	8 48	9 19	4 21	4 50	9 9	9 31	9 46	10 11
S	28	4 1	4 23	9 34	9 54	5 14	5 35	9 50	10 7	10 31	10 51
M	29	4 44	5 4	10 13	10 32	5 55	6 14	10 24	10 41	11 10	11 28
Tu	30	5 21	5 38	10 50	11 8	6 32	6 49	10 58	11 15	11 46	—

Week Day.	Month Day.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
M	1	5 8	5 26	11 17	11 34	8 10	8 25	3 54	4 11
Tu	2	5 44	6 1	11 51	—	8 40	8 54	4 27	4 43
W	3	6 17	6 32	0 8	0 24	9 10	9 24	4 59	5 14
Th	4	6 47	7 2	0 40	0 55	9 38	9 52	5 28	5 42
F	5	7 17	7 32	1 11	1 27	10 6	10 22	5 57	6 13
S	6	7 47	8 3	1 43	1 59	10 38	10 58	6 29	6 46
S	7	8 19	8 36	2 18	2 37	11 21	11 46	7 5	7 24
M	8	8 56	9 20	2 57	3 21	—	0 18	7 46	8 12
Tu	9	9 48	10 25	3 51	4 25	0 55	1 35	8 42	9 20
W	10	11 7	11 52	5 5	5 45	2 20	3 4	10 4	10 52
Th	11	—	0 36	6 26	7 7	3 45	4 22	11 37	—
F	12	1 19	1 57	7 45	8 20	4 55	5 21	0 18	0 55
S	13	2 28	2 54	8 49	9 15	5 43	6 4	1 24	1 47
S	14	3 18	3 39	9 38	9 57	6 24	6 44	2 9	2 28
M	15	4 0	4 20	10 15	10 32	7 4	7 21	2 47	3 6
Tu	16	4 40	4 59	10 49	11 7	7 43	8 0	3 25	3 44
W	17	5 19	5 39	11 25	11 42	8 17	8 35	4 3	4 22
Th	18	5 59	6 19	—	0 5	8 53	9 11	4 41	5 0
F	19	6 39	7 0	0 26	0 47	9 31	9 51	5 21	5 42
S	20	7 21	7 42	1 9	1 31	10 11	10 33	6 3	6 24
S	21	8 4	8 26	1 54	2 19	10 59	11 31	6 47	7 13
M	22	8 52	9 20	2 45	3 15	—	0 9	7 40	8 13
Tu	23	9 55	10 36	3 50	4 31	0 53	1 42	8 49	9 32
W	24	11 23	—	5 15	5 55	2 32	3 18	10 21	11 11
Th	25	0 11	0 55	6 43	7 22	4 0	4 35	11 58	—
F	26	1 35	2 9	7 58	8 30	5 8	5 27	0 33	1 5
S	27	2 38	3 4	8 59	9 24	5 49	6 11	1 33	1 56
S	28	3 23	3 45	9 45	10 2	6 31	6 50	2 16	2 33
M	29	4 4	4 21	10 18	10 33	7 8	7 25	2 50	3 7
Tu	30	4 38	4 56	10 48	11 3	7 41	7 56	3 24	3 40

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub*.), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant.	Port of Reference.
	H. M.	
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 8	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 48	London
Youghall	+0 13	Queenstown

WEATHER FORECAST FOR SEPTEMBER, 1879.

The Currents or Tendency of the Air over the British Islands for the Month of September, 1879.

Date.	Duration.	Force from N. or S.	Force from E. or W.	General Direction from	Duration.	Force from N. or S.	Force from E. or W.	General Direction from
Sept.								
1	6 h.m. to 1 h.a. *	11	4	S.S.W.	1 h.a. to 7 fol. m.	5	2	W.N.W.
2	7 m. ,, 1 a. †	11½	3	,,	1 a. ,, 8 ,,	5	1	,,
3	8 m. ,, 2 a.	11	3	,,	2 a. ,, 8 ,,	5	1	,,
4	8 m. ,, 3 a.	10½	4	,,	3 a. ,, 8 ,,	5	2	N.N.E.
5	8 m. ,, 5 a.	9	5	,,	5 a. ,, 9 ,,	4	2	,,
6	9 m. ,, 6 a. *	7½	7	S.W.	6 a. ,, 9 ,,	3	3	N.E.
7	9 m. ,, 8 a.	6	8	W.S.W.	8 a. ,, 9 ,,	3	4	E.N.E.
8	9 m. ,, 10 a.	3½	10	,,	10 a. ,, 9 ,,	1	5	,,
9	9 m. ,, 11 a.	1	12	W. by S.	11 a. ,, fol. noon	0	6	E. by N.
10	Noon ,, 10 a.	1½	12	W. by N.	10 a. ,, ,,	0	6	E. by S.
11	,, ,, midnight.	4	10	W.N.W.	... ...	...	...	...
12	11 m. ,, 2 fol. m.	7	8	N.W.	0 m. ,, 11 m.	2	5	E.S.E.
13	11 m. ,, 3 ,, †	9	6	,,	2 m. ,, 11 m.	3	4	S.E.
14	11 m. ,, 5 ,,	11	5	N.N.W.	3 m. ,, 11 m.	4	3	,,
15	11 m. ,, 6 ,,	12½	4	,,	5 m. ,, 11 m.	5	2	S.S.W.
16	Noon ,, 7 ,, *	13	4	,,	6 m. ,, noon.	6	2	,,
17	,, ,, 8 ,,	13	4	,,	7 m. ,, ,,	6	2	,,
18	2 a. ,, 9 ,, †	12	5	N.N.E.	8 m. ,, 2 a.	6	2	,,
19	4 a. ,, 9 ,, *	10	7	N.E.	9 m. ,, 4 a.	6	2	,,
20	6 a. ,, 9 ,,	7	10	,,	9 m. ,, 6 a.	5	3	S.W.
21	9 a. ,, 9 ,,	3½	12	E.N.E.	9 m. ,, 9 a.	3	5	,,
22	9 a. ,, fol. noon	0½	14	E. by S.	9 m. ,, 9 a.	1	6	W.S.W.
23	10 a. ,, ,,	3½	11	E.S.E.	Noon ,, 10 a.	0	7	W. by N.
24	... ...	...	...	...	,, ,, midnight	1	5	W.N.W.
25	0 m. to 11 m.	6½	8	S.E.	11 m. ,, 2 fol. m.	3	4	N.W.
26	2 m. ,, 10 m. †	8½	6	,,	10 m. ,, 3 ,,	4	3	,,
27	3 m. ,, 11 m.	10	5	S.S.E.	11 m. ,, 4 ,,	5	2	N.N.W.
28	4 m. ,, noon *	10½	4	S.S.W.	Noon ,, 5 ,,	5	2	,,
29	5 m. ,, ,,	11	3	,,	,, ,, 6 ,,	5	1	,,
30	6 m. ,, ,,	11	3	,,	,, ,, 6 ,,	5	1	,,

Note.—General direction of Tendency due to Sun from N.N.W. giving winds chiefly from N.N.W. to N.N.E. with a rising, and from W.S.W. to W.N.W. with a falling barometer.

Daily change about 4 a.

Moon's maximum N. declination on the 9th = 25° 53′ decrease 10′

,, ,, S. ,, ,, 22nd = 25° 47′ ,, 13′

* Retrograde movements begin. † Expansive movements begin.

The diminution of 10′ will probably be felt during the retrograde movement from the 6th to the 12th—the diminution of 13′ during the retrograde movement from the 19th to the 25th.

REMARKS.

1. Moon coming North from the 1st to the 9th.
   „ going South „ 10th „ 22nd.
   „ coming North „ 23rd „ 30th.
2. Change from the Westerly to the Easterly tendency about the 18th.
   „ „ Easterly „ Westerly „ „ 28th.
   A minor change on the 4th and 15th.

3. The retrograde and expansive movements are most important and deserve careful attention. I have indicated in the Table the dates on which I think these should occur. The Sun being near the Equator during the month a retrograde followed by an expansive movement will probably take place, the former about the 16th, and as there is a retrograde movement due to the moon on that date it will probably be strong. Generally speaking the retrograde movement is a falling motion from the north, and the expansive a rising from the south during the westerly tendency, but the reverse during an easterly. The general tendency of the air during a retrograde movement is from N.W. to N.E. giving winds from N.W. to N.E. rising, or from S.W. to N.W. falling. On the other hand during an expansive movement the general tendency of the air is from S.E. to S.W giving winds from S.E. to S.W. rising, or from N.E. to S.E. falling.

D. D.

CORRESPONDENCE.

DISCIPLINE AT SEA ON BOARD MERCHANT SHIPS.

To the Editor of the "Nautical Magazine."

Sir,—The Prime Minister said before the deputation, which waited upon him in reference to the case of Captain Barnes, of the *Locksley Hall*, that it was his opinion, and also the opinion of his colleagues, that the supreme authority of the British shipmaster in the Merchant Navy should be established upon the high seas. Since that time the President of the Board of Trade and his colleagues have been inquiring and gleaning information as to the behaviour and treatment of British seamen in the Merchant Navy, but nothing has yet been done to improve the position of a merchant captain on board his own ship at sea.

Of late years, since the Plimsollian agitation, and the affair with the captain of the ship *Locksley Hall*, I have been repeatedly defied by my crew, who say, "You cannot put us in irons or you will be imprisoned as was the captain of the *Locksley Hall*." The truth is, a shipmaster has now no effective control over his crew in the Merchant Navy. If a seaman misconducts himself on the high seas, and commits an assault on the master and threatens his life, and refuses duty, and you bring the offender before the justices in a Colonial port, it is more than probable that he will be let off with a reprimand; and if the master leaves the Court without being himself reprimanded or otherwise humiliated for locking the man up or placing him in irons, or for some other imaginary fault, he may be very thankful. I may be allowed to cite a case in point which came under my own observation, viz.: A steward was shipped in Liverpool for Sydney, N.S.W. During the passage he was ordered to trim the binnacle lamps, which is considered part of a steward's duty in a ship of this size. This did not please him; when in order, I suppose, to frighten the master and officers, he went about the deck making his boast that he had licked the master and officers of a ship in Calcutta, and that he did not care for any one on board this ship. One night, in a thunder and lightning squall, the binnacle lamps went out, the ship was brought to the wind in consequence, and nearly dismasted. He was spoken to with reference to the improper way in which he had hitherto trimmed the lamps, and told that the consequences to the ship might be very serious through his neglect. Upon this he became insolent to the master. On being told not to give more insolence, or he would be placed under restraint, he made use of the foulest threatening language, shaking his fist in the master's face. The master then called for a pair of handcuffs, and took hold of him with the intention of placing them on him, when he struck the master in the mouth, and kicked him in a vital part, and the master was for some time laid up sick in consequence.

The following day he was asked to apologise, and to return to his duty; but he insolently refused to do any more work in the ship. At the end of fifteen days the handcuffs were taken off him, and he was ordered to do his duty, but he still insolently refused

to do any more work in the ship, and remained in the apprentices' room all the passage out to Sydney from abreast the Cape de Verde Islands. On arrival at Sydney he was taken before a magistrate, who, in consideration of the punishment he had already undergone, sent him to gaol for twenty-four hours.

Now, I ask if this was a sufficient punishment for a man who kept the remainder of the crew in a state of insubordination the whole of the passage out, who had threatened the master's life, struck him, kicked him, and called him the foulest possible names, in order, no doubt, to induce the master to pay him off at Sydney, where he would get a higher rate of wages.

All these particulars were duly entered in the official log-book, signed by the master, chief, and second mates, and by the eldest apprentice. We are supposed, under all the penalties of the law, to make these entries, and are told that they should be correctly made and signed, otherwise no fine, forfeiture, or punishment can be inflicted on the defaulting mariner. But what became of those entries in the above case? They went for nothing, as do ninety per cent. of all the entries in official logs.

The partiality with which seamen are treated, and the leniency which is shown them when brought before a justice of the peace, for acts of insubordination on ship-board, only incite them to commit further acts of a like nature in the next ship, and in many instances these acts of insubordination are committed by the seaman in order that he may be left behind when the ship sails, and obtain his discharge and wages due after serving some few days imprisonment. What does Jack care for a week's confinement in prison, at the expiration of which time he will get a higher rate of wages, thus obtaining the end he had in view? It is not an uncommon thing for a seaman to cause a disturbance, and to strike the master or officer, in order to get his release from the ship with the whole of his wages due, when he has served the few days imprisonment which the magistrate has allotted him, in a port where wages are higher than the wages at which he shipped in the home port.

It appears to me that the British shipmaster is supposed to allow his crew to abuse him, threaten him, and assault him, while he must be calm and have perfect control over his temper. Should

he so far forget himself as to retaliate under all this provocation, he will be called a monster, a brute, and all that is bad, and probably have to take his trial in a police-court at the suit of one of the crew.

England's greatest judge and jurist, Lord Stowell, has said, that it has hardly been disputed that in a case of gross misbehaviour, the master of a merchant ship has a right to inflict corporal punishment upon a delinquent mariner; that right must be supported by the law of England, which is the proper authority for fixing the limits within which one subject of the realm has a right to inflict corporal suffering upon another.

I think all persons will agree with me, that to threaten the master's life and to strike him upon the high seas, when in the execution of his duty, would constitute, in the language of Lord Stowell, "a gross misbehaviour." But if the British shipmaster were to inflict corporal punishment for the above offences, I think that, notwithstanding the emphatic language of Lord Stowell, it would not be a case of simple imprisonment as with the captain of the ship *Locksley Hall*, but the consequences would be much more serious, when the case would be brought before the Court for investigation.

Although I have been speaking of corporal punishment, I do not think it could be successfully carried out on board a merchant ship, there not being a sufficient staff of officers for that purpose; neither do I think it necessary that it should take place on board. But I think that common justice would demand, that when a seaman had committed an assault upon the master or officer of a ship, and the same had been entered in the official log and duly signed, and sufficiently proved to the Court investigating the case, the offender should be subjected to corporal punishment together with imprisonment and forfeiture of wages. To be sent to prison is nothing to them; I have been told by seamen they would as soon be in prison as on board ship, and I am inclined to believe it.

There has been a great deal said in favour of seamen being required to pass an examination in seamanship as to their qualification, and to obtain from the proper authority a certificate as able or ordinary seaman as the case may be. I cannot bring

myself to believe there would be much advantage gained by this plan over the old system. My own humble opinion is that Jack would be too apt to boast that he held a certificate and that he knew as much as his superior officer, which sort of thing is a fruitful source of disturbance on board ship.

At the present time a master or officer of a ship must not order the crew to do their respective duties as any other employer of labour, but must ask them and coax them; and should the ship be bound to a port where they intend to desert the ship, they really will not, comparatively speaking, do anything more than pleases them during the passage; and if ordered to do work that does not please them, they will perhaps destroy or heave the ship's gear overboard, which I have known them to do. This is the present state of affairs in the British Merchant Navy, and the sooner something is done to give the shipmaster control over his crew, to demand a fair day's work for a fair day's pay, the better for the shipowner, and not only the shipowner but for the community at large. This is of national importance, for I think I am right in assuming that British merchant ships have now great difficulty in competing with American or continental ships. I know a case in which an American ship, of the same tonnage as mine, with four working hands less, could discharge twenty-five per cent. more cargo per diem than we did under exactly similar circumstances.

It certainly is time something was done in the way of legislation for British merchant ships, in order that they may be placed on the same footing as, and be enabled thereby to compete with foreigners, which at present they are unable to do in consequence of not having any control over, and not being in a position to demand from their crew a fair day's work for a fair day's wage, which is not the case in America and other countries. Some of your readers may say, if the seaman does not conduct himself in an orderly manner, and does not perform the duty for which he ships, you can withhold from him, when discharged, a V. G. character; that is quite correct. But what, as a rule, does he care whether he obtains a V. G. discharge or otherwise, when probably he has other discharges to fall back upon, or can

purchase one from a comrade for a couple of glasses of ale, and ship under a fictitious name?

Under the present system of discharge, there is practically nothing to bind the seaman to be obedient, and nothing to prevent him from deserting in a foreign or colonial port when he desires to do so.

The masters and officers of the Merchant Navy have to hold from the Board of Trade certificates for their good behaviour, and if they do not conduct themselves as they should do, their certificates are suspended or cancelled, and, I may say, at times for trifling faults. Without the production of their certificates to the shipping master, they are not allowed to engage as masters or officers on board ship. Why should not the seaman be compelled to hold some such certificate in the shape of a discharge, on which could be registered all the ships the holder had served in since his first going to sea, with the time served and character borne in each ship? This certificate of discharge could, I think, be conveniently made, say, of parchment, so as to last at least fifteen years of the seaman's servitude at sea, or possibly more; and let it be enacted that the seaman could not ship in a British ship without producing his certificate of discharge. The master of a ship would then only have to look at the certificate of the discharge in question to ascertain what character the man had borne in the different ships he had previously served in.

There should also be a marginal column to be filled up by the master of the ship as to the seaman's health. What guarantee have we, under the existing form of discharge, that we are not shipping men who may be totally incapable of doing their duty in consequence of some confirmed disease, which the shipmaster is not able to detect when shipping his crew? It may be said that the shipowner can avail himself of the 10th section of the Merchant Shipping Act, 1867, to have the crew examined by a medical person appointed by the Board of Trade. This would entail expense, and why should the shipowner incur such expense more than any other employer of labour on shore? It may seem harsh to interdict a man who has to earn his bread at sea from pursuing his avocation, but it would in the end be the wisest and most

merciful course. On shore he may have a prolonged existence, whereas at sea the chances are it would be sudden death. It is impossible to say what might be the consequences to the ship, if after she gets to sea it were found that all the crew were sick, and incapable of doing their duty. This of course is improbable, but not impossible. I remember a case which happened on board a ship bound from Liverpool to Callao, some twelve years since, viz., one of the seamen had been sick the greater part of the passage when one of his shipmates deliberately murdered him, saying, "You have sucked my blood long enough," meaning, of course, that he had had to do his (the sick seaman's) work. I mention this incident to show that the consequence to the sick seaman himself may be serious even unto death, other than by natural causes. I feel assured that until such time as a certificate of discharge of something like the foregoing be adopted, and without which the seaman could not ship in a British ship, we shall have no discipline or control over our crews; neither shall we be in a position to demand their best exertions at a critical moment to extricate the ship from impending danger. I may say in conclusion that I believe the abolition of the advance-note system would tend in a great measure to lessen the number of desertions, and make the seaman look more after himself, and seek re-employment before all his homeward earnings were squandered away.

I hope that you will think the subject treated of of sufficient importance to find a place in your valuable Magazine, however crudely written; and that your readers will remember that a "shell-back" is more at home with a marlinspike than with a pen.

I am, Sir,

Wellington, N.Z., Yours obediently,

May 25th, 1879. A SHIPMASTER.

RULE OF THE ROAD AT SEA.—SOUND SIGNALS.

To the Editor of the "Nautical Magazine."

SIR,—As I see by the papers there is some legislation going on with regard to the safe navigation of the Thames, and knowing the interest you take in nautical affairs, I hope you will not think this

letter out of place, nor its suggestions, I might say, not only for the River Thames, but for all narrow waters. In navigating the River Thames myself I have often experienced the difficulty, when meeting another steamer, to know whether he will port or starboard, and we had no means of letting each other know our movements or intentions, and think the following *whistle signals* could be easily introduced as well as easily understood :—

One short whistle—I am going to port my helm.

Two short whistles—I am going to starboard my helm.

M. and N. are meeting, M. blows one short whistle and ports; N. answers with one short whistle to show that the signal is understood, and also ports.

Again, M. and N. are meeting; M. blows two short whistles and starboards, N. answers the signal and starboards.

Again, M. and N. are meeting; M. blows one short whistle, but N. from some difficulty of navigation, or considering he has not room to port, blows two short whistles in reply, and lets M. know he is obliged to starboard; M. answers with two short whistles and starboards, and should a collision be imminent, both use their utmost endeavours to avoid it.

Again, M. is overtaking N.; M. blows one short whistle and ports, N. replies with one short whistle, to show the signal is understood, or starboards, if necessary, to give M. more room.

Again, M. is overtaking N.; N. blows one short whistle and ports, M. answers with one short whistle, to show that the signal is understood, and starboards to keep clear of N.

One long continued whistle calls attention and means "I am coming;" a succession of short sharp blasts, say 6 or 7, is danger, and means, "Keep back."

Three whistles is safety, and means, "Come on, you can pass."

Four slow short and distinct whistles means, "I want to speak."

Vessels going with the tide should be agreed to have the right of way, as they are not so easily stopped as a vessel going against the tide.

Answering—When not in difficulty always answer a signal by repeating it, and the first to whistle, who, as a rule, should be the

vessel having the right of way, will understand that her movements are understood, and all is well.

For example, M. is going down the river with the tide, meeting N. coming up; M. blows one long continued whistle; N. answers by another similar blow, to show that he knows M. is coming and that all is well.

In this instance, however, N., as circumstances may occur, could also reply with three whistles, "Come on;" or short blasts, "Keep back;" but repeating a signal should always mean, "All is well."

These private signals could be made amongst the different companies a rule of their own, or might be made compulsory, so as to stand in a court of law.

I may say the above whistle signals are not new, and, I believe, are used in the United States, so that an American steamer, meeting one of ours, would understand the signal at once.

I certainly think, as a pilot for my own vessel on the Thames, that the above rules would facilitate the navigation, and lessen the chances of collisions. They would prove of great advantage off Gravesend, as inward-bound vessels like to come as close to Gravesend as possible to receive their Custom-house officers, and that is considered, as per Rule of the Road, the wrong side of the river, and I have seen several narrow escapes of collision.

Hoping you will not think me intruding on your valuable space,

I remain,

Yours faithfully,

A MASTER MARINER AND SUBSCRIBER.

Hong Kong, May 5th, 1879.

THE "PRINCESS ALICE" AND THE "BYWELL CASTLE."

To the Editor of the "Nautical Magazine."

SIR,—You have done me the honour to extract from the *Times* a letter of mine, referring to the case of the *Princess Alice;* to express your inability to understand my meaning; and to invite explanations. Perhaps you will kindly allow me a word myself.

The *Bywell Castle* stated that she saw all three lights for a

moment on her port bow in succession to *red* and white only; and that she thereupon ported her helm. The Admiralty Court and the Court of Appeal have both declared distinctly that this was a wrong movement.

The point of my letter was that this ruling of the Courts is new. I am open to correction, but I could not recall any previous ruling so distinct on this very common movement, and it seemed desirable to draw attention to it, as it agreed with all that I knew of the seamanship of avoiding collision.

I have said that seamen are not generally aware of the danger of this movement. If you look in the *Shipping Gazette* of the 19th July, you will see a letter from Captain George Langlands very distinctly confirming me. He does not agree that the movement of the *Bywell Castle* was a wrong one, and says, "you are not to starboard to a green light on your port."

He quotes Mr. Gray's verses as his authority, and therefore supports my statement that matter circulated by the Board of Trade encourages such movements as the *Bywell Castle* employed, and which the Courts have pronounced to be wrong. The "signal" the *Bywell Castle* received was the change of lights from *red* and white alone to all three lights.

I may say that I am not surprised that there should be difficulties in understanding my views. At present only a very few of the leading naval men do understand them. But a brief explanation of them may be given if I say that so long as the signals made by the present lights are obeyed by either ship, it is very difficult for the other to make a collision, and almost impossible for her to make a bad one.

I am, your obedient servant,

Harrow, August 16th. P. H. COLOMB.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

2876. Walker Moseley and Thomas Shepherd Trumble, both of Liverpool. "Improvements in and relating to apparatus for sounding and measuring depths of water at sea applicable also to measuring depths of liquids generally."

2943. Joseph Garcin, Marseilles, France. "An improved system of ships' lights." (A communication.)

2946. John Henry Coombs, Boston, U.S.A. "Improvements in water-meters also applicable to measuring steam." (A communication.)

2951. Edouard Reyer, Vienna, Austria. "Improvements in apparatus for evaporating water or other fluids, or for drying substances containing water." (A communication.)

2959. Jules Boehm, Bastide-Bordeaux, France. "Improvements in casks, barrels, hogsheads, and the like vessels." (A communication.)

2970. James Bell and Joseph James Coleman, both of Glasgow. "Improvements in apparatus or arrangements for cooling and regulating the temperature of air in holds, saloons, and cabins of ships, and in railway vehicles, hotels, theatres, halls, factories, hospitals, slaughter-houses, and other interiors."

3024. Arthur Wallwyn Shepheard, Windermere, Westmoreland. "Improvements in life-buoy apparatus."

3044. James Casey, Philpot Lane, London. "A safety boat-plug to be applied to boats in order to secure the safety of human life."

3059. Almon Mitchell Granger, Liverpool. "Improvements in and relating to chemical fire extinguishers for ships and other navigable vessels, and other purposes."

3083. Robert Arber Ray, Grimsby. "An improved 'horse' or device for securing the sheets of fore and aft sails to the deck."

3132. Severin Lauritzen, Copenhagen, Denmark, and Walter Claude Johnson and Samuel Edmunds Phillips, both of Charlton, Kent. "A new means of electrical communication between vessels at sea and the shore, or between two or more vessels at sea."

3146. John David Napier and David Napier, both of Glasgow. "Improvements in or connected with winches as applied on shipboard."

3191. William Clarke, Gateshead. "Improvements in steering apparatus for ships or vessels."

3207. Count Emile Siccardi, Paris, France. "An improved apparatus for reversing electric currents, chiefly designed for use in connection with submarine telegraphs." (A communication.)

3223. James Domney, Birmingham, and Thomas Taylor, of Hanley. "Improvements in the manufacture of measuring vessels."

3285. Henry Thomsen, Lübeck, Germany. "Improvements in fog-horns or fog-signals." (A communication.)

AMERICAN.

213859. W. B. Atkinson and H. C. Atkinson, Franklin. "Shipping cases."

214115. J. L. De Wolfe, Nova Scotia. "Ships' pumps."

214343. H. O. Ames, New Orleans. "Methods of obtaining pure water from rivers."

214616. J. W. Brown, Mayfield. "Propellers for vessels."

214833. G. Milsom and R. Heneage, Buffalo. "Culinary vessels."

BELGIAN.

48577. W. B. Barker. "An improved code and apparatus for making safety signals at sea."

48588. J. W. Watson. "Improvements in steering apparatus for vessels."

48669. G. Longfellow. "Improvements in sea compasses."

48670. A. Blondot and J. Bourdin. "A process and apparatus for laying submarine cables."

48671. A. Blondot and J. Bourdin. "A submarine cable."

FRENCH.

128687. Delaurier, Paris. "A perpetual marine motor for propelling vessels by means of the horizontal motion of the waves."

128692. Bisson, Paris. "So-called 'gyro sea compasses.'"

128697. Douglas MacDonald. "Folding and expanding vessels."

128698. Bru, Jun. "India-rubber boats."

128811. Pelte. "Propelling ships' boats, &c."

128846. Braconnier, Paris. "Sea and air navigation."

129308. Gareis. "Improvements in liquid sea compasses."

GERMAN.

6866. E. W. Mayer, Posen. "An apparatus for turning ships' screws on their vertical axle for steering purposes."

NORWEGIAN.

7. H. J. Cole, Wandsworth. "Cleansing the bottoms of ships and vessels."

83. K. G. Lundborg, Stockholm. "A vessel for breaking ice."

PORTUGUESE.

321. C. and T. Vafea. "Raising and floating sunken vessels and other submerged bodies, and apparatus employed therefor."

447. C. J. N. Rebour. "A power-multiplier, applicable on land, at sea, and for ballooning."

PATENTS PUBLISHED.

198. 17th January, 1879. Price 6d. Henry Augustus Severn, South Kensington, Middlesex. "Mariners' Compasses." This invention has for its object to provide means whereby any deviation between optional limits from the prescribed course of a vessel at sea is indicated to the officer in charge, by means of an audible or visible signal at any convenient part of the vessel. The compass card is supported upon a metal point, which is connected to the one end of a wire circuit, in which is included a

battery and a signalling apparatus, actuated thereby, and the other end of which circuit is electrically connected to a spindle passing centrally through the glass lid of the compass. The spindle has attached to it underneath the glass lid a metal arm, projecting radially from it and rotated by means of a button at the top of the spindle. A second such metal arm is fixed to a metal sleive, fitting the spindle so as to rotate upon it, also provided with a button at the top. Both arms have a piece of platinum wire loosely suspended at their extremity, and can be set at any desired angle. As the ship deviates from her course a metal arm projecting radially from the centre of the card comes into contact with one of the suspended platinum wires, and closing the electrical circuit, rings a bell. The invention may either be applied to the ship's compass at the helm or to a special compass in the officers' cabin.

1236. 28th March, 1879. Price 6d. Gerard Sickels, Boston, Suffolk, Massachusetts, U.S.A. "Self-levelling Berths, State-rooms, &c." (Complete specification.) The berth is supported upon a central pivot on its under side and is governed in its tilting movement by a spherical weight which rolls freely on a rigidly supported concave surface below the berth ; the weight of the ball is proportioned to the weight of the berth or structure and its contents, and in order to increase friction the ball is coated with leather. To prevent the berth from tipping while a person is getting into and out of it, a series of cords are attached to the corners of the berth and pass over pulleys on fixed bearings and connected in the centre over head to a regulating mechanism consisting of a swivel pivoted to the casing at the side of the berth and provided at the ends with links which are pivoted to the swivel so as to swing freely from it, the cords being connected to the links.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
249	England—East Coast—Kentish Knock Light-vessel	Proposed alteration in fog-signal.
250	Ireland — East Coast — Dublin Bay — Bailey Lighthouse	Alteration in fog-signal.
251	Baltic Entrance—Sound—Flint Channel	Various changes.
252	„ „ Copenhagen	Buoyage of torpedo ground.
253	Baltic—Christiansö Island	Alteration in light.
254	„ Gulf of Riga—Runö Island	Alteration in light.
255	Mediterranean—France—Mentone	New harbour lights.
256	„ Sardinia—North-East Coast	Discovery of shoal in channel.
257	„ Cyprus—Famagousta	Rock in fairway entrance.
258	Red Sea—Hedjaz—El-Weg	Light to be discontinued.
259	Persian Gulf—Arabian Coast	Various instructions.
260	India—Bay of Bengal—False Point	Additional notice about light.
261	China Sea—Philippine Islands—Mindoro Strait	Shoal near Busuanga island.
262	China — East Coast — Lema Island — Taitami Channel	Discovery of sunken rock.
263	South Australia—Spencer Gulf	Discovery of shoal patch.
264	„ Gulf of St. Vincent—Adelaide	Lights for the channel to the port.
265	United States—Pacific Coast—Sitka Harbour	Discovery of sunken rock.
266	„ Puget Sound	New fog-signal on Point Wilson.
267	„ California —Wilmington Harbour	Depth of water over bar.
268	„ Delaware Bay—Five Fathom Bank	Temporary change of light and fog-signal.
269	„ Maine—Casco Bay	Discovery of rock.
270	Newfoundland — South Coast — Great Colombier Island	Discovery of rock near island.
271	„ East Coast — Notre Dame Bay	Discovery of rock near Smoker island.

NAUTICAL NOTICES.

249.—England.—*East Coast.—Kentish Knock Light-Vessel.—Intended Alteration in Fog-Signal.*—On or about 16th October, 1879, the character of the fog-signal at Kentish knock light-vessel will be changed, to give *two blasts* in quick succession every *two minutes*, instead of one blast every minute as at present.

250.—Ireland.—*East Coast.—Dublin Bay.—Howth Bailey Lighthouse.—Alteration in Fog-Signal.*—On 1st September, 1879, the horn will be discontinued, and in place thereof a powerful syren will be established, which, during thick or foggy weather,

will give a blast of *five seconds'* duration with an interval of *fifty-five seconds.*

251.—Baltic Entrance.—*The Sound.—Flint Channel.*—The following changes have been or are about to be made :—

(1.) *Malmö.—Position of Low Leading Light.*—The position of the low leading light at Malmö is, lat. 55° 36′ 55″ N., long. 13° 0′ E.

(2.) *Siollen Light-Vessel.*—About 15th August, 1879, this light-vessel would be shifted to a position northward of the shoalest part of Oscargrund, and named after that shoal. Position intended, lat. 55° 35′ 40″ N., long. 12° 51′ 25″ E.

(3.) *Kalkgrund Light-Vessel.*—About 15th August, 1879, it is *intended* to make the following *alteration* in the position of Kalkgrund light-vessel, and in the character of the light exhibited :—The light-vessel will be shifted to a position about 1½ cables north-west of Kalkgrund. It will be a *flashing* light, showing a flash of *one second* duration at intervals of *one second.* Position intended, lat. 55° 36′ 50″ N., long. 12° 53′ 40″ E.

Note.—These light-vessels, when placed in their intended stations, should be passed on the north-western side—and kept in line will lead through Flint channel. When the light-vessels are moored at their new stations, some alterations will also be probably made in the sectors of the outer (and lower) light at Malmö.

252.—Baltic Entrance.—*The Sound.—Torpedo Ground near Copenhagen.*—The locality between Provestenen and Mellem forts, near Copenhagen, has been appropriated for Torpedo practice; and buoys and beacon lights have been placed (as in former years) to mark the limits within which Torpedo experiments would be made.

253.—Baltic.—*Christiansö Island.—Alterations in Light.*—It is now a flashing white light, showing a flash every *thirty* seconds, elevated 95 feet above the sea, and visible 15 miles.

254.—Baltic.—*Gulf of Riga.—Runö Island.—Alterations in Light.*—The lighthouse on Runö island has been rebuilt, and the light, fixed white, is elevated 210 feet above the sea, and visible 12 miles. Position as given, lat. 57° 48′ 0″ N., long. 23° 15′ 0″ E.

255.—Mediterranean.—*France.—South Coast.—Harbour Lights at Mentone.*—Two lights are exhibited at Mentone harbour

entrance: one from a lighthouse recently erected on the south-east angle of Vieille Tour, near the mole in course of construction; the other from a lighthouse on Garavan beach.

Vieille Tour light is *fixed*, showing *green* from the inner harbour to the bearing S. 59° W.; *red* through an arc of 46°, or between the bearings of S. 59° W. and N. 75° W.; and *white* through the remaining seaward arc: it is elevated 51 feet above the mole, 54 feet above high water, and visible in clear weather as follows—the green light, 5 miles; the red light, 6 miles; and the white light 10 miles. Position as given, lat. 43° 46′ 30″ N., long. 7° 30′ 30″ E.

Garavan Beach light is *fixed green*, visible through an arc of 51° or between the bearings of N. 15° W. and N. 66° W.; it is elevated 26 feet above the ground and 34 feet above high water, and should be seen 5 miles.

Note.—Vessels will be clear of danger with the white light of Vieille Tour in sight; but to enter the harbour, the red sector of that light must be crossed—this sector should not be entered till Garavan beach green light comes in sight, and which should be then steered for. When Vieille Tour light changes from red to green, haul to the westward for the anchorage.—*Variation, 13¾° W.*

256.—MEDITERRANEAN.—*Sardinia.—North-East Coast.—Shoal between Molarotto Islet and Cervi Rocks.*—This danger, south-eastward of Tavolara island, and the existence of which has been proved by the surveying vessel *Washington*, renders the channel between Molarotto islet and Cervi rocks unsafe. The passage between Molara island and Cervi rocks is practicable; vessels using it should keep on the western side of the channel.

257.—MEDITERRANEAN.—*Cyprus.—East Coast.—Famagousta.—Danger near Fairway Entrance.*—The following account of a detached sunken rock lying to the northward of the channel—marked by a leading beacon—into the fairway entrance for the port of Famagousta, has been received from Staff Commander Millard, engaged in the survey of that place:—This rock has 21 feet water over it, and lies N. ½ W., 2¼ cables from the buoy placed to mark the northern end of the line of reefs and shoal ground running parallel to

the shore northward from Messanisi island. The rock is one cable's length northward of the channel with 34 feet water, indicated by the leading beacon on the shore abreast kept in line with the peak of the Holy Cross mountain near Larnaca. It is also to the northward of the Twenty-six feet rock which heretofore had been assumed as the shoal boundary of the line of reefs stretching from Messanisi island. *Variation*, 3¾° *W*.

258.—Red Sea.—*Hedjaz.—Intended Discontinuance of Light at El-Weg* (*Sherm Wej-h*).—The Quarantine station at El-Weg having been removed to Tor, in the gulf of Suez, the light exhibited on the south side of the entrance to El-Weg harbour will be discontinued on 1st October, 1879.

259.—Persian Gulf.—*Arabian Coast.*—The following information has been recently received from various sources:—Ras-ash-Shajar, 0° 0′; Shatt Al-'Arab, 1° 30′ W.

(1.) *Ras-ash-Shajar*, situated about 40 miles north-west from Rás-al-Hadd the south entrance point of the gulf of 'Oman, is a low sandy point, well defined only when seen from close in shore; about 3½ miles southward of Ras-ash-Shajar, the mountains begin to recede from the coast, the low land continuing to about 3½ miles northward of the cape, where the mountains again approach the beach. A shoal, on which the British barque *Marian Moore* was wrecked in 1879, extends about three-quarters of a mile from Ras-ash-Shajar. H.M.S. *Teazer*, 1879, anchored on this shoal in 5¾ fathoms, rock and sand, about 4 cables from the shore, with Tower Fins bearing S. 7° E., and east extreme of Ras-ash-Shajar N. 54° W. *Variation*, 0°.

(2.) *Bahrain Harbour.—Rás-Zarwán.*—A beacon consisting of a stout hand mast surmounted by a barrel (vertical) painted black with a broad white band, has been erected on Rás-Zarwán, east side of entrance to Bahrain inner anchorage.

(3.) *Basrah River* (*Shatt Al-'Arab*).—The bar at entrance of Basrah river changes, and the buoys are shifted accordingly, but should not be depended on. In March, 1879, they were reported out of position, but the soundings in the channel were considered generally to have remained the same as formerly—12 feet at low water springs. *Variation*, 1½° *W*.

260.—INDIA.—*Bay of Bengal.—False Point Anchorage.—Intended Temporary Discontinuance of False Point Light.*—With reference to Notice No. 100, p. 358, further notice has been given, that it having been found impracticable to exhibit the present light from False point lighthouse during the intended improvements, the light will be discontinued on November 1, 1879; and a blue light, immediately followed by a rocket, will be burnt from the upper part of the lighthouse every *fifteen minutes*, from sunset to sunrise, for a period of three months from that date. Particulars of the new light will be given in due course.

261.—CHINA SEA.—*Philippine Islands.—Mindoro Strait.—South Entrance.—Shoal Eastward of Busuanga Island.*—This danger (*Framjee rock*), on which the *Merwanjee Framjee* touched on 15th November, 1878, appeared to be of small extent and steep to, the general depth over it was estimated to be from 24 to 26 feet; it lies with the following bearings, viz.:—South extreme of Calanhayaun, N.W. ½ N.; Calis point (Coron peninsula), S.W. by W. Position approximate, lat. 12° 0′ N., long. 120° 32′ E. *Variation*, 1° *E.*

262.—CHINA.—*East Coast.—Lema Islands.—Taitami Channel.—Sunken Rock Southward of Taitami Islet.*—This danger (*Mosquito rock*), about 3½ cables southward of Taitami islet, northern side of Taitami channel, approach to Hong Kong, is about 50 feet long in an east and west direction and 20 wide; there are 13 feet over it at low water spring tides, with depths of from 8 to 10 fathoms between the rock and Taitami islet; it lies with the following bearings, viz.:—South-east extreme of Taitami islet, N. 58° E.; South-west extreme of Taitami islet, N. 30° W. Position, lat. 21° 57′ 35″ N., long. 114° 8′ 0″ E.

Note.—The south-east extremes of Tamkan and Yechau islands in line (bearing N.E. by E.), lead south-eastward of Mosquito rock; Echau head (Pountin island) well open of the western extreme of Taitami islet, bearing north, leads westward of Mosquito rock. *Variation*, ¾° *E.*

263.—SOUTH AUSTRALIA.—*Spencer Gulf.*—The existence of a shoal patch, having a radius of about half a mile, with 4 fathoms of water over it, has been reported; the position given by compass

bearings being, Mount Young, N.W., and Hummock hill, N. by W. ½ W.

264.—South Australia.—*Gulf of St. Vincent.—Lights in the Channel Leading to Port Adelaide.*—On or about the 15th day of July, 1879, thirteen gas lights would be exhibited, between sunset and sunrise, from beacons which have been erected on the most prominent points of the channel leading to Port Adelaide. They should be left on the starboard hand entering from seaward. Further particulars will be furnished in due course.

265.—United States.—*Pacific Coast.—Sunken Danger in approach to Sitka Harbour.*—This danger (*Keen rock*), situated dangerously near the track of vessels using Middle channel, is about 10 yards in diameter; the least depth found upon it was 16 feet at low water, with 4 fathoms close to in all directions, and 7 fathoms within a boat's length from it. From Keen rock, the west extreme of Nepovorohnoi rock (Rockly island) bears N. 29° W.; the south extreme of Volga island N. 38½° E.; the western extremity of Quitoway (Whale) island S. 71° E., and the south extreme of Wooded island (Mokhnatoi islands) S. 68½° W.

Clearing Mark.—The centre of Surf rock (Polivnoi islands) bearing S.W. ½ S., leads one cable south-east of the rock. *Variation, 29° E.*

266.—United States.—*Pacific Coast.—Washington Territory.—Fog-Signal on Point Wilson, Puget Sound.*—On and after September 1, 1879, a steam fog-signal will be maintained on Point Wilson, south side of Admiralty inlet, Puget sound, near Port Townsend. The signal is a steam-whistle, 12 inches in diameter, and will be sounded during thick and foggy weather, giving blasts of 8 *seconds' duration* at intervals of 52 *seconds.*

267.—United States.—*Pacific Coast.—California.—Depth of Water over the Bar at Entrance of Wilmington Harbour.*—The newly-constructed harbour at Wilmington, at about one hour before lower high water, had not less than 12 feet depth on the bar. And one hour and a half before higher high water, not less than 16 feet depth in the channel. (June, 1879.)

268.—United States.—*Delaware Bay.—Five-Fathom Bank.—Temporary Change of Light-Vessel, and in Fog-Signal.*—Five-

fathom bank light-vessel has been withdrawn from her station for repair; and Relief light-vessel temporarily takes her place. This vessel is painted red, with the word *Relief* on her sides, and hoop-iron cage day marks at each masthead. The lights are the same as before. As Relief light-vessel is not provided with a *steam* fog-signal, during thick and foggy weather a bell will be rung and fog-horn sounded. Notice will be given when Five-fathom bank light-vessel is again placed at her station.

269.—United States.—*Maine.—Johnston Rock, Casco Bay.*—The existence has been established of a dangerous rock between Outer Green island and Green island reef, Casco bay. The rock bears N.E. ¾ E., distant ¼ mile from the northern extremity of Outer Green island, and will be named *Johnson rock;* it is but a few yards in extent; the least depth found was 7 feet, deepening rapidly to 6 and 8 fathoms all around. Vessels using this channel would do well to pass close to the southward of red buoy No. 2, to the northward and eastward of the rock.

270.—Newfoundland.—*South Coast, St. Pierre Island.—Sunken danger near Great Colombier Island.*—This rock (*Little shoal of Great Colombier*), about 16 yards in extent, has 4½ feet over it at low water, and is steep to, with a depth of 8 fathoms (over sand and rock) around it at the distance of 30 yards; it lies with the following mark and bearings, viz.:—North extreme of Great Colombier island, S.E. ¾ E., distant 4 cables; North-west extreme of Great Colombier island, S.W. ¼ W., distant 2¼ cables (in line with the western red patch westward of Henry point). *Variation*, 28° *W.*

271.—Newfoundland.—*East Coast, Notre Dame Bay.—Sunken Rock Southward of Smoker Island.*—This rock on which there is a depth of 9 feet, lies S.S.W. ½ W. from Smoker island south extreme, distant 2¼ cables. A shoal on which there is 3 fathoms water, lies half a cable north of this rock.

Clearing Mark.—Ragged islets kept open north of Smoker island, bearing N.E. ½ E., leads north of these dangers. *Variation*, 34° *W.*

OUR OFFICIAL LOG.

Official Inquiries at Home.

332. *Riversdale*, ship; built at Seacombe, 1865; owned by L. and H. McIntyre, Liverpool; tonnage, 1,490; Cardiff to Penang; coals; stranded on the Nash Sand, Bristol Channel, 1879. Inquiry held at Cardiff, July 5, 1879, before Rothery, Wreck Commissioner; Forster and Parfitt, N.A. Master and mate to blame for having, after the tug had cast the ship adrift, navigated the vessel in an unseamanlike manner. Master's certificate suspended for six months and mate's for three.

333. *Rockabill*, s.s.; owned by the Clyde Shipping Company, of Glasgow; tonnage, 149; Glasgow to Limerick; cargo chiefly coals; stranded on the Irish coast, near Antrim, June 10, 1879. Inquiry held at Glasgow, July 8, 1879, before Rothery, Wreck Commissioner; Visconti and Ward, N.A. Master in default, but in the circumstances was only warned.

334. *Foam;* owned by W. Jenkins, of Plymouth; tonnage 211; Porto Rica to Plymouth; sugar; stranded at the entrance of Falmouth Harbour, July 1, 1879. Inquiry held at Plymouth, July 15, 1879, before Rothery, Wreck Commissioner; Holt and Sceales, N.A. Master to blame for careless navigation and neglecting to use the lead. Certificate suspended for six months. Recommended for one as mate.

335. *Ottercaps*, s.s.; built at Sunderland, 1878; owned by Messrs. Morton and Straker; tonnage, 625; Bilboa to Sunderland; iron ore; stranded on the Roches des Renard, 8th June, 1879. Inquiry held at Sunderland, July 11, 1879, before Rothery, Wreck Commissioner, Visconti and Ward, N.A. Master to blame for keeping too close inshore, and for proceeding at full speed through a dangerous channel. Certificate suspended for three months.

340. *Congou*, ship; built at Sunderland, 1865; owned by Mr. Staunton and others; tonnage, 824; Hull to Buenos Ayres;

coals; stranded on a sand bank in the Channel, 9th July, 1879. Inquiry held at Lowestoft, July 25, 1879, before Rothery, Wreck Commissioner, Hight and Forster, N.A. Casualty due to the master's fault, but in the circumstances his certificate was returned with a warning.

343. *Black Swan*, s.s.; built at Shields, 1864; owned by Messrs. Smith, of that port; tonnage, 411; Boulogne to Newcastle; ballast. Inquiry held at Newcastle, August 1, 1879, before Rothery, Wreck Commissioner, Pickard and Ravenhill, N.A., as to cause of explosion of the boiler, which took place on June 29, whereby four lives were lost. Casualty due to the bursting of a plate in the combustion chamber, which had become thin from corrosion. No charge made against master.

Official Inquiries Abroad.

243. *Ettalong*, schooner; stranded on the Bar at Camden Haven. Inquiry held at Sydney, May 5, 1879. No evidence adduced on which to found a charge against the master.

325. *Margaret Chessell*, schooner; lost on the beach at Newcastle, N.S.W., after vainly endeavouring to ride out a gale of wind. Master drowned.

326. *Crosby*, barque; lost on Fannings Island. Inquiry held at Honolulu, May 19, 1879. No blame attached to master.

327. *Sir Isaac Newton;* stranded near Noumea, April 15, 1879. Inquiry held at Noumea, New Caledonia, April 24, 1879. Master acquitted of blame.

328. *Maggie*, brigantine; stranded on Mozelle Shoal, May 5, 1879. Inquiry held at Nassau. No blame attached to master.

329. *Alice*, schooner; stranded on the English Bank River Plate, May 11, 1859. Naval Court held at Monte Video, June 13, 1879. Master and mate acquitted of all blame.

330. *Neptune's Car*; stranded on Cade's Reef, May 25, 1879. Inquiry held at Antigua, June 5, 1879. Casualty due to an error of judgment and want of proper precaution on the part of the master.

336. *Ridge Park*, s.s.; grounded in Port Adelaide Harbour,

May 30, 1879. Inquiry held at Adelaide, June 9, 1879. Casualty due to the bad steering qualities of the vessel, and no blame was attached to the master.

337. *Helen*, barque, and *City of New York*, s.s.; in collision off the New Jersey coast, June 28, 1879. Naval Court held at New York, July 2, 1879. No blame attached to the officers of the barque, and the master was drowned when she foundered. There was no evidence of what transpired on board the steamer previous to, or at the time of, collision.

338. *Euro*, s.s.; grounded south of Moonta Jetty, Spencer Gulf, June 4, 1879. Inquiry held, June 7, 1879. Casualty due to a dense fog.

339. *Alice Ritson*, ship; lost on the Horadada Rocks, April 30, 1879. Naval Court held at Callao, May 7, 1879. Master censured for running on in a dense fog instead of heaving the ship to. He was ordered to pay the expenses of the Court.

341. *Annie Murchie*, brigantine; abandoned at sea, June 24, 1879. Naval Court held at New York, July 12, 1879. Master justified in abandoning the vessel.

342. *Fathay Allum*, barque; lost at Cochin, May 23, 1879. Inquiry held at Cochin. Master guilty of misconduct in neglecting to go on board his vessel, and take steps for the safety of the vessel. Certificate suspended for six months. Mate's certificate cancelled.

344. *Turtle*, ketch; stranded in Newcastle Harbour, N.S.W., May 17, 1879. Casualty due to the vessel missing stays.

Killarney, s.s. and a Chinese fishing junk; in collision off Aichow Island, when four lives were lost. Inquiry held at Hong Kong, May 1, 1879. Accident caused through the junk carrying no lights.

GENERAL.

Unseaworthy Seamen.—Merchant seamen themselves are at last moving in this matter. We have on more than one occasion pointed out during the last few years that the seamen rather than the ships require legislation. Many a so-called seaman is now-a-days simply a fraud who ships under false pretences, goes "malingering" as soon as he gets on board, and throws on the competent and willing men a double amount of duty for which they get no extra pay, while he often draws full wages. The thing is monstrous. No man ought to be able legally to claim the wages and rating of A.B. who has not served four years at sea, and no one the rating of O.S. who has not served one year. All other hands should be shipped as boys, lubbers, novices, green horns, loblollys, or some other name which Jack will be able to invent. We are glad to find that a meeting of seamen has been held in the Orange Hall, Greenock, which unanimously agreed that this petition should be presented to the House of Commons:—"Your petitioners, being seamen in the port of Greenock humbly showeth, that many evils in the state of our Mercantile Marine arise from the shipment of incompetent and unworthy seamen, and that much valuable life and property are endangered therefrom; that competent seamen are harassed and overworked in consequence of these incompetent men being employed, and for this extra work the competent seamen can recover no pay; that your petitioners are of opinion that compulsory examination of seamen with reference to their experience and competency would be very beneficial for securing a higher standard of efficiency in the manning of our ships, and thus would do much to put an end to the system of crimping prevalent in our principal ports, and prevent men from being shipped as seamen who have no experience whatever of the sea." We most strongly urge upon masters and seamen that they leave no effort untried to ensure the success of this movement. It is what has been repeatedly advocated in these pages.

THE EDDYSTONE.—The foundation stone of the new lighthouse tower intended to replace Smeaton's famous structure, was successfully laid on the 19th August, by H.R.H. the Duke of Edinburgh, Master of the Trinity House, in the presence of the Prince of Wales and a party of distinguished visitors. As has been previously mentioned in our pages the erection of a new lighthouse has become necessary, in the opinion of the Trinity House authorities, in consequence of the rock upon which Smeaton's structure stands having been so undermined by the action of the sea as to imperil the stability of the tower. The new lighthouse is intended to be in every respect a more commodious building than the present one. Its elevation will be considerably higher, which will enable the light to be visible at a greater radius than hitherto. Its height will be 130 feet above high water at spring tide, with a solid cylindrical basement of granite twenty-two feet in height, springing from four feet below low water at spring tide. The lighthouse will contain nine rooms, affording accommodation for four light-keepers and ample storage space, and in the solid basement water tanks will be provided. The works on the new Eddystone were begun on 17th July, 1878, and it is anticipated that the light will be shown from the new tower in about four years' time from now.

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REPORT OF THAMES TRAFFIC COMMITTEE.

Second Notice.

THIS able Report shows us that the Rules of the Road on the Thames are at the present moment, and in strict law, identical or nearly identical with the existing Rules of the Road at Sea. The Report also shows conclusively—if anything beyond the frequent occurrence of serious collisions were necessary to convince any-one—that those rules are wholly or almost wholly inapplicable, insufficient, and improper above Gravesend. But the evidence shows even more than the Report, for it shows that while some masters and pilots act on the rules, improper and insufficient as they are, other masters and pilots never knew, until knowledge was forced on them by the collision between the *Princess Alice* and the *Bywell Castle*, and the sacrifice of nearly 800 lives, that there were any steering rules whatever applicable to the naviga-tion of the Thames below London Bridge.

Another point is, that the general public and many sailors are under the impression that the Steering and Sailing Rules for the

Thames are framed, promulgated, and enforced by the Board of Trade. The Report, evidence, and appendices, however, show that the Body responsible for the existing rules, and the only Body having power to make new rules, whether by adopting the suggestions of the Thames Traffic Committee or otherwise, are the Conservators of the Thames. That Body makes the rules, whether they be good or bad, and on that Body rests the responsibility for promulgating them amongst all classes and persons interested. The pilots are expected to know the rules: how far some of them have fallen short of this expectation will be understood on reference to the evidence of the pilot given at page 644 of our number for August.

The most important steps to secure permanent safety on the river are the disestablishment of the "free watermen and lightermen," and the abolition of compulsory pilotage; but pending those important steps, we trust, in the interests of the safety of life and property, that the Thames Conservators will stir themselves, and either make new rules as recommended by the Thames Traffic Committee, or if they cannot see their way to make new rules, that they will endeavour to enforce the existing rules. That the existing rules are insufficient as a whole, and that they might be better in parts, is no answer to the state of uncertainty, doubt, and ignorance on the part of those navigating craft in the Thames, as disclosed by the Report and evidence. If new rules are not to be made, then all doubt as to the validity of the existing rules should be removed.

We take it for granted, however, not only that the present rules will before long be abrogated by the Thames Conservators, but that that Body will also make new rules which, when approved by Her Most Gracious Majesty in Council, will have the force of law, and that the new rules will be in effect and in substance, if not in precise wording and arrangement, identical with those recommended by Lord Sandon's Committee of Experts. For us to come to any other conclusion would be to assume that the governing Body for Thames navigation hold views opposed to the Report, and holding them

would enforce them in face of the Report. As we regard such a thing to be impossible, we shall proceed to lay before our readers an analysis of the rules which, we believe we are not wrong in thinking, will at no distant date become the law of the Thames.

By way of introduction, however, it is necessary that we point out the geographical features as well as the arbitrary divisions of the Thames Estuary and River. Geographically, the estuary of the Thames may be taken to have for its Eastward or Seawards limit an imaginary line drawn from St. Osyth Point in Essex, to Foreness or the "North Foreland" in Kent. This is the limit which has for nearly thirty years been accepted by the Board of Trade and stated on the certificates which they issue to what are known as "partially smooth-water" steamers. The westward end of the estuary or mouth terminates at an imaginary line drawn from the Chapman Light to the East Blyth Buoy. Within these two imaginary lines are the various narrow channels, which, leading from the sea, eventually, at or about the Nore Light-vessel, resolve themselves into "Sea Reach." Sea Reach extends from the Nore Light to the Mucking Light with scarcely any deviation from a straight course, but in it, off Southend, is the "Leigh Sand;" to the northward of the Leigh Sand is the deepest narrow channel, called Leigh Channel, and to the south of the Leigh Sand is a part of Sea Reach proper, which there is nearly as deep as Leigh Channel.

Physically, the Thames may be divided into four parts, namely, the mouth and estuary from Foreness and Osyth to the upper end of Sea Reach, which may be regarded as its "sea" part; secondly, from the upper end of Sea Reach to Tilburyness, which is plain and easy river navigation for all seagoing craft; thirdly, from Tilburyness to Woolwich, which is the part for careful navigation under purely river rules; and fourthly, from Woolwich upwards to London Bridge, in which part there is scarcely opportunity for anything like speed and safety combined. The higher up one gets from Woolwich towards London Bridge, the more does the traffic resemble an assemblage of corks stirred round in

a bowl of water; everything is mixed up, and it is only by elbowing and the most careful working that a large vessel can make her way through the crowds of craft she meets or overtakes.

The river, however, for purposes of the jurisdiction of the local authorities, is not divided into four parts as indicated above, but is divided into two parts. The estuary from St. Osyth Point and Foreness up to London Stone (or Southend Pier), is not under the jurisdiction of the Thames Conservancy, but is under the sea rules. Thus ships in one-third of Leigh Channel and one-third of Sea Reach are navigated under the sea rules, and in the other half of Leigh Channel and the other two-thirds of Sea Reach, under river rules.

Again, for pilotage purposes the river is divided also into two parts, but the dividing line for pilotage does not correspond with the dividing line for Conservancy purposes. For pilotage purposes it is Gravesend. Up to Gravesend the sea pilot has charge, and from Gravesend to London Bridge the river pilot, or "mud master," takes charge.

It will be seen from the above, that the artificial divisions do not correspond with each other, and that neither of them correspond with what might be deemed to be physical divisions.

The Thames Traffic Committee have instituted further divisions, wholly artificial, but guided in the main, if not solely, by the requirements of the traffic. The divisions that follow on the Thames Traffic Report are—Division 1, including the estuary and channels within two lines, one drawn from St. Osyth Point to Foreness, and the other from London Stone across to a spot near Southend pier; Division 2, from Southend pier upwards to Blackwall; Division 3, from Blackwall upwards to Teddington; Division 4, from Teddington to the source of the river.

The rules applicable, when the Report of the Committee is adopted, will, in each of these divisions, be as set forth in the following analysis :—

Two Sailing Vessels approaching each other so as to involve risk of Collision.

DIVISION 1. Narrow channels below Southend Pier.	DIVISION 2. Between Southend Pier and Blackwall.	DIVISION 3. Between Blackwall and Teddington.	DIVISION 4. Above Teddington.
The vessel running free shall keep out of the way of the one close-hauled.	The vessel running free shall keep out of the way of the one close-hauled.	Not to neglect any precaution required by the ordinary practice of seamen, or the special circumstances of the case.	To be navigated in a careful and proper manner.
Close-hauled on port tack to keep out of the way of close-hauled on starboard tack.	Close-hauled on port tack to keep out of the way of close-hauled on starboard tack.	Same as above.	Same as above.
Both free with wind on different sides; the one with wind on port side to keep out of the way.	Both free with wind on different sides; the one with wind on port side to keep out of the way.	Same as above.	Same as above.
Both free with wind on same side; the one to windward to keep out of the way of the one to leeward.	Both free with wind on same side; the one to windward to keep out of the way of the one to leeward.	Same as above.	Same as above.
One with the wind aft to keep out of the way.	One with the wind aft to keep out of the way.	Same as above.	Same as above.

Sailing Vessel and Vessel under Steam proceeding in such direction as to involve risk of Collision.

Steamer always to keep out of the way of the sailing vessel. Steamer always to slacken speed. Sailing vessel always to keep her course.	Steamer to slacken speed. Steamer to keep out of the way if safe and practicable and sailing ship to keep her course; but if it is not safe and practicable for steamer to keep out of the way, steamer to blow 4 blasts and to slacken speed, when sailing vessel is to keep out of the way.	Same as above; and steamer to slacken speed and not to cause danger to other vessels.	Same as above; and not to damage or cause danger to other vessels nor to the banks.

Steam Vessels meeting so as to involve risk of Collision.

Division 1, *continued*	Division 2, *continued*	Division 3, *continued*	Division 4, *continued*
Each is to Port if they are meeting end on or nearly end on.	If one is going up and the other is going down, and there is risk of collision, they are to pass port side to port side. [If there is no risk of collision they are both to keep their course and pass either starboard side to starboard side or port side to port side.]	Same as above.	Same as above.

Two Steamers each Crossing the path of the other.

The one having the other on her own starboard side to keep out of the way, and the other to keep her course.	No rule. To have due regard to the dangers of navigation, and not to neglect any precaution required by the ordinary practice of seamen, or the special circumstances of the case.	Same as in Division 2.	Same as above.

Steam-Vessels rounding Points.

No rule.	The one going against the tide to wait under the point until the one going with the tide has passed clear.	No rule.	No rule.

Steam-Vessels crossing the Fairway.

DIVISION 1, *continued*	DIVISION 2, *continued*	DIVISION 3, *continued*	DIVISION 4, *continued*
If end on, both to port: If not end on, the one having the other on her own starboard side to keep out of the way, and the other to keep her course.	If one is crossing the fairway from side to side, and if the other is going up or down, the one crossing over is to keep out of the way, and the one going up or down is to keep her course. If both are crossing the fairway so that their courses meet or intersect, there is no rule. But neither is to neglect any precaution required by the ordinary practice of seamen, or by the special circumstances of the case.	Not to neglect any precaution required by the ordinary practice of seamen, or by the special circumstances of the case.	Same as above.

One Vessel overtaking another.

The overtaken vessel is to keep her course. The overtaker is to keep out of the way.	Same as Division 1.	Same as Division 1.	No special rule.

Steamships in Narrow Channels.

Every steamer is, when it is safe and practicable to do so, to keep to the starboard side of the fairway or mid channel.	A steamer may go which side of the channel she pleases, but if she meets a steamer coming in an opposite direction, and if there is danger of collision, they are to pass port side to port side.	No rule as to side.	No rule as to side.

On the above Table, the first point which suggests itself for consideration, is whether the arbitrary line adopted for the sudden change from sea rules to river rules is the best one. At the present moment, the sea and river rules being identical, the difficulty of finding a place at which one shall begin and the other end, has not arisen; but now that the river rules are at last to be different from the sea rules, one of the most important items to be settled is the spot where the one shall begin and the other end.

The considerations that would appear to be necessary to determine this knotty question, are—

1. Where do inward bound ships usually bring up in the river?
2. Where do the sea pilots leave the ships and hand them over to the river pilot, or mud master?
3. Where is there a place, if any, which, as well as affording a usual place for bringing up, presents a point where no danger need be apprehended of a transition from sea rules to river rules?
4. Looking at the question as affected by physical or geographical conditions, which part of the river is best adapted for the changing point from one set of rules to the other?
5. Looking at the question as affected by trade usage, and the ordinary practice of seamen and the special circumstances of the case, which part of the river is best adapted for the changing point?
6. Is there any part of the river or channels that could be selected, so as not to fix the point of change in that part of a narrow channel where ships do not usually bring up.

The reader will bear in mind that the arbitrary line denoting the commencement of the jurisdiction of the Conservators is across the river from about Southend Pier, really from Crow Stone to London Stone. Beyond the fact that this imaginary and arbitrary line is the boundary of the Thames Conservators' jurisdiction, there is no other fact whatever in favour of making the merging point of different rules there: whilst against making it there, is the fact that it cuts right across Sea Reach and Leigh Channel. A steamer bound inwards would, by such an arrangement, be condemned in costs, if near to or below Southend Pier she came into collision

with another vessel anywhere but on the starboard side of Sea Reach or of Leigh Channel, as she would be subject to sea rules. Whereas, immediately on passing a little way above Southend Pier she would be at liberty to go on either side of Sea Reach or of Leigh Channel, and would be subject to the river rules. On the whole, there is in favour of making the transition line near Southend, the one fact that the Conservators' jurisdiction extends to that point; whilst against it are the facts that the Conservators can, if they so elect, apply the sea rules higher up; that the change will, if it there take place, be in two narrow channels; and that there is no geographical, physical, commercial, customary, or other necessity which indicates that point as *the* point. So much for what may be advanced as against fixing the line at (Southend Pier) London Stone and Crow Stone. As regards Gravesend, every one of the six considerations we have named would appear to indicate that place as the one point at which the transition from one set of rules to another might take place.

But it may be said that, if a line from Southend pier to London Stone is too low down, Gravesend is too high up the river; and that fact alone weighs against every one of the six considerations we have advanced. Such an objection may have great force in it, but seeing that a transition *must* be made somewhere, and that, so to speak, the river and its approaches *must* be subject to two or more separate and distinct sets of steering and sailing rules, will it not then be better at least to make the most important transition line somewhere else than in channels entering the river from the sea, and where there is no natural configuration, no visible sign, and no commercial or other necessity requiring it.

No part of the difficult subject presented to the Traffic Committee appears to have received at their hands a fuller and more conscientious consideration than this question of the Rule of the Road and the starboard-side, and we think our readers cannot do better than study pages 14 to 24 of the Report before they consider our suggestions. Those ten pages contain one of the most complete and exhaustive essays ever written on the navigation of any river, and they carry conviction with them. We cannot have a doubt that every point put forward in this article in favour

of extending the sea rules further up the river, and in applying the starboard-side rule over any part of the river under the jurisdiction of the Conservancy Board, did receive the very fullest consideration at the hands of the Committee: and we observe the following paragraph on page 19 of the Report:—"Your Committee, *with one exception*, are not prepared to recommend the adoption of the starboard-side rule in any of the above cases." The "above cases" referred to are the cases—First, of vessels proceeding up and down the river between London Bridge and Victoria Docks; Secondly, of vessels proceeding up and down between Yantlet Creek (Southend pier) and Victoria Docks; Thirdly, the case that the starboard-side rule could only apply to steamers and vessels towed by steam; and, Fourthly, the case that a starboard-side rule would be inapplicable for steamers rounding points from Coal House Point upwards. The reasons for the last case are put with great completeness and force, not the least of them being the dangers that would beset crowds of craft which, owing to circumstances, would be found in a reach on the starboard side of the steamer, and into which crowd the steamer might be forced by a starboard rule. There is nothing, however, in any part of the Report to show that any one of the objections so forcibly put against the starboard rule elsewhere apply against it in that part of the river known as Sea Reach, whilst there is the fact that one of the members of the Committee dissented from his colleagues as to the applicability of the starboard rule to "any" of the cases named in the Report.

Really, however, the question of applying the starboard-side rule and the rule for meeting and crossing steamers to Leigh Channel and Sea Reach is not one in which we should alone have dared to differ from the Thames Traffic Committee. We should not now, even, have raised the question but for respect due to the members of the International Committee who also made rules to meet the case, and it is because the recommendations or rules of the two Committees place seamen between two fires, that we think the subject worthy of discussion. By the recommendations of the International Committee ships navigating the lower two-thirds of Leigh Channel and the lower one-third of Sea Reach will be subject

to the sea rules for meeting and crossing sailing ships, and meeting and crossing steamers; to the starboard-side rule for steamers; and to the rule that steamers are to get out of the way of sailing vessels. By the recommendation of the Thames Traffic Committee the same vessels, immediately they have passed an imaginary and unmarked line in the same channels, will be subject to the same rules for meeting and crossing if they happen to be two sailing ships; but to different rules both as to meeting and crossing, as well as to starboard side, if one or both of them happen to be under steam. It requires strong argument to show that what is right for the lower two-thirds of one channel and the lower one-third of another, is not right for the upper third and two-thirds of the same channels, especially when it is borne in mind that one of the channels referred to is under five miles in length. The knotty question is one which the Thames Conservators alone have the power to elucidate when they come to put forward their new rules.

With the above observations we commend the subject to such of our readers as may be interested in it. To the sea and river-faring communities, it is very gratifying to find, after most diligent and anxious study, the only point in the Report on which a discussion is possible, is whether the line marking the jurisdiction of the Conservators should be the dividing line of the river and sea rules, or whether by the action of the Conservators the sea rules may not with advantage be continued a little higher up the river.

In a subsequent article, we intend to offer a few remarks on the subject of whistle signals, and on the remaining clauses of the proposed rules.

THE CHINESE MARITIME CUSTOMS.

(*Continued from page* 749.)

ALLUSION has already been made to the less reputable foreign houses engaged in the China trade. Mr. Lay, the first Inspector-General, stated his belief that "from the corrupt and weak Chinese officials anything could be extorted by bribery or by bullying." Without doubt the treaty ports contained residents who did not hesitate to take advantage of this want of strength and of rectitude. These persons were naturally opposed to the introduction of a system in which honesty and regularity were insisted upon. They cried out, of course, and circumstances for a time gained for their outcry an attention which it was far from deserving. The transaction of business in China between foreigners and natives differed considerably from that usual in other countries. Difficulties of language, and peculiarities of manner on the part of the local officials, had led the Western merchant to leave all dealings with the Customs in the hands of a native servant, called linguist, *shroff*, or *compradore*. The former rarely came into contact with the natives. The compradores were the only persons known officially at the Custom House, and became, as it were, securities for their employers. The plan had its advantages. The foreign merchant was saved direct personal participation in evading the Revenue Laws. Even where the principal was able to ensure honest dealing on the part of his *employé*, he felt it an advantage to be able to hold aloof from intercourse with persons whom he despised, and who returned his contempt with interest. Perhaps, many an international complication has been avoided by the absence of some high-spirited Englishman from the *Yamun*, and his seclusion in his office, whilst his compradore was engaged in "passing" the cargoes of his ships. In the East the European is apt to assume somewhat of a lordly tone; and the successors of the East India Company's agents, at Canton, could hardly fail to have inherited some of the dignified habits of the latter.

In the purest department of an Oriental Government there is sure to be much laxity of procedure, and a want of punctuality and systematic arrangement. When the European, who has to do with it, has been brought to suppose that this is irremediable, he usually marks his acquiescence in it by an exhibition of his superiority to the inferior beings, who tolerate it without protest. The demands of the foreign merchant became rather commands, addressed to the Mandarin through his subordinate, than requests. The Englishman especially knew his rights, and enforced them after the masterful fashion of his race. Likely enough there was scarcely a clerk of European birth in the great *hongs* at the treaty ports who did not feel persuaded that he was vastly the superior of the Mandarins, with whom a compradore—*servus servorum* as he was—was quite good enough to deal. No wonder that the *Tae-pan*—the great European head of the firm himself—scorned to have personal communication with them. Things, not unnaturally, went on in a free-and-easy way, "in which offences and mistakes were winked at, condoned, or rectified; and duties compounded for or paid when convenient." This had become fully established when the new system arose to introduce order into chaos, regularity into unrestrained irregularity, and punctuality where disregard of time had been almost a merit. The foreign community, wealthy and prosperous, had begun to exhibit some of the vices of an aristocracy, and accepted the existing condition of things with contemptuous indifference, not concealing its disdain of anyone who attempted to reform it.

The change, though admittedly beneficial, was attended with several unpleasantnesses. The merchant found installed in the Custom House a European, who declined to be considered an inferior being, and insisted on personal communication with the proper responsible agents. Regular hours were fixed, between which business must be transacted, if it was to be taken in hand at all, and an exact observance of the rules and formalities of correspondence and documentary procedure was insisted upon. Chambers of Commerce protested against the inconveniences which they declared the new system caused them, and the "additional trouble" to which they avowed they were being put. These protests

having been forwarded to Earl Russell, then Foreign Minister, were handed to Mr. Lay, the Inspector-General, who was in England, for such observations as he might be able to make upon them. He asserted that he had examined the books, and inquired into the mode of transacting business at the London and Liverpool Custom Houses, and that he had "no hesitation in saying that the merchant in China has not a tenth part of the trouble that the London or Liverpool merchant has." It was, no doubt, unfortunate that in the opposition which was being shown to the new institution, honourable firms, who merely had some small personal inconveniences to complain of, were made to appear as allies of those who sought every opportunity of evading the Chinese Revenue Laws. Mr. Lay, with a singular want of discretion, acted so as to give to this alliance a still greater appearance of reality. Having been, as he supposed, attacked by the general body of foreign merchants in China, he sought to defend himself and the service of which he was the head, by carrying the war into his opponents' country. This he did by charging some of the most eminent of the great western *hongs* with deliberate infractions of the law, and alleging in a serious public document that they were no better than smugglers. The cases he adduced in support of these charges do not appear to justify more than an allegation of carelessness on the part of their local agents, or of a failure to maintain strict discipline amongst their *employés;* and were refuted by such as thought it incumbent on them to notice them at all. But the mistake had been made of arraying all classes, honourable and unscrupulous alike, against the system. Lord Elgin found, on his return to China, that "all the old animosity against the foreign Inspectorate, or rather against the employment of foreigners in the collection of the Chinese Customs had been revived." This animosity, as must have been observed by every unprejudiced visitor to the treaty ports, is yet far from being completely allayed. Still, owing to the tact and honourable conduct of the present Inspector-General and his subordinates, it has considerably subsided.

The enemies of the establishment did not conduct their operations against it with much skill. Lord Elgin, Sir Frederick Bruce,

and the Home Government, concurred in holding that it was beneficial to our trade with China, and could not with justice be objected to. The merchants had expressed fears that the foreigners who had been attracted to the service were of a class from which very unscrupulous acts were to be apprehended, and plainly hinted that the social position of even the higher officials in it was not such as to inspire confidence in their integrity or discretion. A very sufficient answer to these suggestions was given by the mere publication of the names and previous employment of the Commissioners at the several ports. It is, certainly, not too much to say of them that in social standing they were, at the least, the equals of the most eminent members of the foreign community, and that the important public offices which many of them had previously held proved incontestably that they were perfectly fitted to conduct the duties of the posts to which they had been appointed. Baron Hübner, whose opinion on the subject is entitled to the greatest weight, says that the Chinese Customs' Service "has the first pick of the best men, much to the detriment of the Legations and Consulates." Sir Walter Medhurst,* calls them "a thoroughly able and well-educated body of men."

Nevertheless the mercantile community, and notably the English portion of it, continues to some extent to profess a feeling of superiority to the officers of the Customs' service in the matter of social standing, which appears supremely ludicrous to the unbiassed stranger. Though matters have undoubtedly improved, there have been occasions on which the members of the service have been exposed to very serious unpleasantnesses, chiefly because of the honourable fidelity with which they perform their duties. Under the old system the examination of goods for the assessment of duties was justly regarded as a mere farce. When the Chinese was replaced by a foreign examiner, the latter naturally and properly declined to continue the old method, and would not certify that goods were in all respects what they were reported until he had satisfied himself of the fact by actual examination.

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* *The Foreigner in Far Cathay.* London, 1872: p. 54.

To such examination, we learn, there were many objectors, and it is admitted that the Customs' authorities did sometimes behave with a want of forbearance that encouraged retaliation and created much ill-will towards themselves. "The merchants," says Mr. Hart, "with but few exceptions, at first treated the people connected with the Inspectorate as being their natural enemies. It was considered rather correct to show that they regarded the foreigner in Chinese employ as being the low rowdy a popular paper styled him, and to make him feel that his position deprived him of all title to social amenities."

The clamour which arose against the Inspectorate in China reached England, and an echo of it was heard within the walls of Parliament* itself. And it is a significant comment on the usually accepted belief in the repugnance of the Chinese to all reform, that it was they who first ceased to offer resistance to the new institution. We have Mr. Hart's authority for the following statement:—"The Chinese mind is with difficulty turned from a groove in which it has been accustomed to run; but it is satisfactory to those who demand progress—which, in order to be sure, cannot well be other than slow—to remark that, once diverted from an old and accustomed to a new mode of thought or action, it would be as difficult to turn it back again." This statement will be readily corroborated by all unprejudiced persons, unfortunately a very small number, who have had opportunities of making the acquaintance of the people in their own country. The view of the Chinese character taken by such men as Lord Elgin and Sir Frederick Bruce differs greatly from that with the expression of which the ears of a visitor to the treaty ports are so often saluted, when he desires to learn something of the people from the members of the foreign community.

A very inaccurate estimate of the work done by the Customs' establishment, as now constituted, would have been formed, had not the difficulties and opposition which it had to encounter been fully dwelt upon. For it must be borne in mind, that every step which

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* See discussion in the Commons, July 7, 1863.—*Hansard*, Vol. IV.

it felt called upon to take, met with much resistance, in general passive on the part of the native officials, and active on that of the Western merchants; and that opposition to it was by no means confined to the early stages of its existence. However, when but four years had elapsed since its first foundation, the Treaties of Tientsin provided for the adoption of a uniform system of collecting duties on goods carried in foreign bottoms at all places open to trade. By degrees the foreign Inspectorate was extended to all such ports. The first place at which it was established, after experience of its working at Shanghai had shown what it was capable of effecting, was Canton. There are two circumstances connected with its extension to this port which are worthy of notice. One was, that it was more or less directly due to the action of the Hoppo himself, in consequence of his having learned the great increase that foreign supervision had caused in the amount of duties collected at Shanghai. The other was, that the office was opened in the autumn of 1859, and the arrangements connected with it were perfected, notwithstanding that it was in that year that friendly relations between the Celestial Empire and two great Western States were interrupted by the occurrence at the Ta-koo forts on the Pei-ho, and that a resumption of hostilities was certain.

When peace was finally re-established, the Yang-tze, the Great River, was declared open to trade; and the port of Chin-keang was selected as the first place on it at which duties should be levied after the foreign method. The Chinese head of the Customs at Tien-tsin, a city of 800,000 inhabitants and the seaport of the capital, who was also Superintendent of Trade for the northern ports open to foreigners, of his own motion proposed that he should have the assistance of the strangers, and in every way aided the introduction of the Inspectorate. Ningpo, Amoy, and Foo-Chow, the remaining three places opened by the old Treaty of Nanking, soon shared in the advantages of the new system. Local officials, as well as the western communities at all places rendered accessible by the more recent treaties, began to regard the establishment of the new Custom Houses in their neighbourhood as a matter of course; and by the middle of 1864, at every

point to which foreign commerce had obtained access, might be found a properly established staff for enforcing the revenue regulations of the Empire. That is to say, from Neuchwang, in Manchuria, beyond the Great Wall, to Canton in Southern China; from the mouth of the Great Yang-tze to Hankow, six hundred miles from the sea; and along the shores of Formosa were distributed little knots of foreigners armed with recognised powers, who were engaged in giving to the officials and trading classes of the middle kingdom a practical lesson in purity of administration, and regularity and punctuality in the conduct of business. The position of the Inspectorate is now so secure, that it is able to precede, instead of waiting for the advent of the foreign merchant at any newly opened port. A glance at the last number of the *Service List* shows that the places rendered accessible by the provisions of the late Chefoo Convention have already received offices suitable to their requirements.

The volume just mentioned has considerable interest. It contains official lists of the several members of the service, classified according to rank and seniority, appropriately bound in yellow, the colour especially affected to the Imperial service; it is printed at the Customs' press at Shanghai, and issued by the statistical department of the Inspectorate. Every name on its pages appears both in Roman type and Chinese character. The *personnel* is divided into two principal divisions—the Revenue and the Marine Department, of which the former employs 413, and the latter 81 foreigners, all filling posts of some importance, and many of them offices of great responsibility. Mention has already been made of the cosmopolitan character of the staff; and it may be interesting to note the several nationalities comprised in it. They are British, American, French, German, Swiss, Norwegian, Swedish, Danish, Austrian, Hungarian, Russian, Spanish, Portuguese, Dutch, Belgian, Italian, and Mexican. As may be supposed from the greater share in the maritime commerce of the Celestial Empire enjoyed by ourselves, the persons of British nationality greatly outnumber those of all the others put together.

At the head of the whole establishment is an Inspector-General, whose head-quarters are fixed at Peking. Originally he held his

appointment from the Governor-General of the two Keang, in which Shanghai is situated; but he is now appointed by the *Tsungli-Yamên*, or Foreign Office, with which he corresponds direct, and through which he forwards his reports to the Board of Revenue. This in itself is indicative of the remarkable revolution which the success of the institution has been the cause of in that supposed impregnable fortress of Chinese conservatism, the Mandarin bureaucracy. The principle of the Government was that it was provincial; the financial wants of the central administration were supplied out of such surplus as remained after those of the local Governments had been provided for. It is perhaps no exaggeration to say that the Government at Peking had practically no more direct authority over a distant province than our own Cabinet has over Fiji or the Falkland Islands. The fiscal connexion was maintained by a periodical remittance to the capital of the balance of the local revenues. Now the central Government has its representative at every important centre of maritime trade in the Empire. These gentlemen have a recognised official position, being granted a relative rank with the more important of the Mandarins, and are in receipt of handsome salaries. In fact, as Baron Hübner tells us, the scale of remuneration of the service generally is "far above that given by European Governments." The practice in collecting duties is understood to be, that the actual sums paid are received not by foreign, but by Chinese officials, certain Mandarins being appointed as colleagues of the former. The duty of the foreigners is to keep the books in a proper manner, and send into head-quarters at Peking returns showing what the native collectors have to account for. It results, probably from this wise arrangement, and from the liberality with which they are treated in the matter of salaries, that the character of the foreign members of the service, surrounded as they must be by many temptations, stands as high for incorruptitude and faithful discharge of duty as that of any public service in the world.

The institution has proved so valuable to the Imperial Government that its continued maintenance for many years may be regarded as certain. In the important collection of statistics—

drawn up by the Customs' staff—may be seen how greatly the general revenue of the Empire is benefited by its existence. This work was published to illustrate the contributions sent by China to the Vienna Exhibition in 1873, in compliance with a request made to the Inspector-General by the Austrian envoy at Peking, Baron Calice. From it it appears that the total sum collected in 1863 was £2,800,000, the cost of collection being about 9 per cent.; in 1872 the revenue had risen to £3,890,000, whilst the cost of collection was only 6½ per cent. The last two years have not been very prosperous ones for China, but there has been an expansion of trade since the latter of the two dates mentioned, and it may be mentioned that, in round numbers, the Imperial Government can now rely upon an annual sum of about four millions sterling, due to the Customs levied upon foreign goods or goods imported in foreign bottoms. This is, most likely, the only portion of its entire revenue on which it can rely, and it is certainly more than double the precarious return it had to look to when duties were collected—or rather a pretence was made of collecting them—under the old system. It was chiefly, if not entirely, owing to the aid afforded by the foreign Inspectorate at Shanghai that it was possible to keep up the "ever-victorious army," so ably led by our countryman Gordon, and, as a consequence, that the Tae-ping rebellion was suppressed when it was, a fact that may enable us to estimate the service rendered by the establishment to the Empire.

It is not, however, solely because of the civilised and regular methods which it has been the means of introducing into the collection of the revenue that it merits the gratitude of those nations whose business relations with China are extensive. As already hinted at, great progress has been made in rendering the waters of the Empire more safe for the vessels which have to navigate them. "The establishment of lighthouses on the China coast," says a recent American writer,* "is chiefly due to Mr. Hart." The coast line of the Middle Kingdom and its dependencies, in-

* "American Cyclopædia." New York. 1874. Art., *China*.

cluding the banks of the Yang-tze to Tchang and the shores of Formosa and Hainan, is greater than those of France and Spain united. Throughout this vast extent of coast, but a generation since almost unknown to the navigators of the West, there is now a system of lights and beacons which would not discredit our own Trinity House. Channels have been sounded and marked with buoys. A sensible set of regulations for the good order of the different anchorages has been drawn up. Capable harbour-masters have been appointed to superintend the berthing of vessels arriving at the ports. Adequate arrangements, by means of well-constructed landing places and sheds for the reception of goods, have been made to meet the requirements of importers wherever the trade is large. A pilot-service, composed of a superior class of American and European master mariners has been constituted, and placed under the supervision of the Commissioners of Customs. And several neat and admirably equipped steam cruisers, commanded by Europeans of character, are employed in enforcing respect to the Revenue Laws, and keeping up communication between the various stations. The great fleet of steam and sailing vessels belonging to our Commercial Marine, which is engaged in the China trade, makes us the chief participator in these great advantages. At the same time it is not to be forgotten that, as on the China station is employed a larger squadron of Her Majesty's ships than in any other part of the world, except the Mediterranean, our Royal Navy derives no small benefit from the existence of the foreign Inspectorate.

It is fitting that the English public should be made acquainted with the excellent work which is thus being done in China, a work of which the largest portion has fallen to the lot of our fellow-countrymen to perform. In all our dealings with races, whom we consider inferior to ourselves, it is doubtful if we could find much that we can dwell on with such satisfaction, or which is so greatly to our credit, as the progress of this institution, due to the suggestion of Sir Rutherford Alcock. The mere fact of its existence would seem to place our relations with the Celestial Empire on a more satisfactory footing than they would otherwise have been likely to assume. "Their perfect acquaintance," says Sir Walter

Medhurst, "with the language, the acquirement of which is made a condition of advancement, the intimate relations in which they stand by virtue of their functions towards the Chinese Government, and the confidence with which these officers have been treated by the Governments to which they severally belong, as well as by their own countrymen, have all combined to place the foreign Customs' staff, and more especially its leaders, on a splendid vantage ground for convincing the Chinese that their true interest lies in extending and consolidating their intercourse with foreign nations." That they have availed themselves of the facilities thus afforded them as they should have done is the opinion of impartial and competent persons. Baron Hübner speaks warmly of the manner in which the present Inspector-General has taken advantage of his unusual opportunities. The American authority, already cited, observes, "Mr. Robert Hart is at the head of the whole system, and is credited with being an adviser of the Government in all its affairs with Western States. That official deserves credit for having so managed his trust as to consult the rights of people of all nationalities, and to build up the most efficient Customs' establishment in the world." In fact nearly every European Government having relations with China has recorded its sense of the services rendered to civilization and to commerce by the present Inspector-General by conferring upon him some mark of distinction. By the Government of his own country alone, notwithstanding the direct advantages it has derived from them, have these important services been allowed to pass without adequate or public recognition. It was generally understood, that, during the protracted negotiations which took place between the representatives of Great Britain and of the Flowery Land, after Mr. Margary's murder in Yun-nan, and which resulted in the Che-foo Convention, Mr. Hart occupied the honourable position of friend to both parties, and occasionally of mediator between them. It seems to be admitted on all sides that the position accorded to him was no more than that to which, by his high character and his talents, he was justly entitled.

COAL CARGOES.

(By the Editor.)

THE articles which were communicated to us, and which appeared in our numbers for June and August, have been very much misapplied. They have been mistaken by some of our readers, who have asserted that we do not approve of surface ventilation of coal cargoes, and that we think it to be of little or of no use as a provision against casualty in coal-laden ships. We desire to point out that this is in no way the case.

Our pages are open to contributions from all persons who have anything interesting or useful to impart to our readers, and we think we should be failing in our duty to the public were we to decline to afford space for the purpose. We always, however, take care not to identify ourselves with the opinions expressed in communications from outside the members of our own staff, and when we receive a paper from outside we either print the name of the contributor or state at the outset that the article is "communicated." This we did in the case of the two articles referred to.

We do not of course know what inferences the general body of our readers may have drawn from those articles: but to our mind they mainly seemed to show that surface ventilation is not a panacea against all casualties in coal-laden ships, and to make known the fact that certain kinds of patent fuel are free from two dangers that beset other coal cargoes, that is to say, the danger of spontaneous combustion of the coal itself, and the explosion of gas given off by coal. Assuming that any fuel, be it patent or otherwise, is free from liability to spontaneous combustion and does not give off gas, then we think that our space has not been occupied amiss in publishing the fact.

A different point from the question, whether *patent* fuels give off gas in a ship's hold—and one far more important—relates to the two special dangers to which *ordinary coal cargoes* are undoubtedly liable, and to the remedies against those dangers recommended by the Royal Commissioners. On this point our

readers will be greatly in error if they assume that we do not advise shipowners to adopt the means recommended by the Commissioners, so ably presided over by Mr. Childers. Our endeavours all along have been to enforce on our readers the necessity for complying with the recommendations of that Commission. Indeed, we were almost the first who took a decided and emphatic line in that direction, and devoted space to enforcing proper views thereupon. So important do we think the matter, and so valuable do we regard the conclusions at which the Royal Commissioners arrived, that we again bring those conclusions to our readers' notice. They are, in the words of the Commissioners, as follows, viz.:—

Dangerous Coal.

"Certain descriptions of coal are intrinsically dangerous for shipment on long voyages."

Spontaneous Combustion.

"The breakage of coal in its transport from the pit to the ship's hold, the shipment of pyritic coal in a wet condition, and *especially ventilation through the body of coal cargoes*, conduce to *spontaneous combustion*, even though the coal may not be unfit for conveyance on long voyages."

"*Spontaneous combustion* in coal cargoes would be less frequent if regard were had by shipowners and underwriters to these facts."

"In order to make known the description of coal liable to combustion, the Inspectors of Mines should be instructed to hold inquiry into all cases of *spontaneous combustion* occurring in cargoes of coal taken from their respective districts: exporters being required always to record on their specifications the denomination of the coals forming the cargo."

Moisture.

"It would appear that the wetting of certain kinds of coal, more especially those containing pyrites, is active in promoting *spontaneous combustion*."

Explosion of Gas given off by Coal.

"With a view to guard against *explosion*, free and continuous egress to the open air, independently of the hatchways, should be

provided for the explosive gases by means of *surface* ventilation, which should be effective in all circumstances of weather."

"Every coal-laden ship should be fitted with shafts or ventilators piercing the upper deck, but not carried down on to or through the coal, with *cowls* always trimmed, so as to form a downcast and upcast current of air which would then pass continuously and in all weathers over the surface of the coal, carrying with it any *explosive gas* as fast as it is evolved."

General.

"When coal is being carried on long voyages, the temperature in the various portions of the cargo should be tested periodically by thermometer, and registered in the log."

"No additional legislation with reference to the conveyance of coal by sea is required, unless for the purpose of giving effect to our proposals with regard to the inquiries by Inspectors of Mines and to the fuller specification of coal entered outwards at Her Majesty's Customs."

Extinguishing Fire.

"We are of opinion that water and steam are the only agents practically available for the purpose of extinguishing fire in coal cargoes."

Breakage.

"In all methods of loading, the chief aims should be to subject the coal to as little breakage as possible, and to avoid any accumulation of small coal in cargoes."

We have been at pains to get out above, not only the recommendations in the summary, but also those in the body of the Report, and we have endeavoured to present them in an intelligible form by putting them under *italic* headings of our own.

The recommendations speak for themselves, and come out with admirable clearness. We will now endeavour to indicate the persons who should act as guardians or police in seeing that the remedies are applied.

First and foremost comes the Wreck Commissioner. It is clearly his duty to call to account every person concerned, without fear,

favour, or affection, if in any case that comes before him any of these precautions are neglected. It is also his duty to make an example of anyone who tries to evade responsibility under the subterfuge that a writer in our pages, or in any pages, has said something inconsistent with the above recommendations. We have not noticed, however, that a master's certificate has been dealt with because of, or that owners or agents have had to pay costs in respect of, any of the matters named below under "Fifthly."

Secondly come the insurers. If safety is to be sought by the action of the parties interested, surely the insurers ought at once to decline to take risks on "certain descriptions of coals known to be intrinsically dangerous." It would open up a new and rich vein if the Wreck Commissioner were to have the insurers before him as "parties" to the case, and we do not see why he should not; they often contribute to the endangering of Jack's life as much as anyone, as it is only *because* they undertake all risk on payment of a sum of money, that the ship sometimes dares go to sea at all.

Thirdly come the coalowners. It is greatly to the credit of many that they have notified the fact that their coal needs surface ventilation, &c. But coal agents and shippers and owners generally can no more be expected to cry "stinking fish" than vendors of other commodities.

Fourthly come the shipowners. We should very much like to see a general agreement among shipowners to adopt certain known plans. We are not aware of any who systematically place wrought-iron testing pipes or pockets in their cargoes of coal, into which thermometers may be inserted without letting air into the cargo, or who place at the master's disposal a set of thermometers, whereby he can ascertain the temperature of the various parts of the cargo periodically, so as to enter it in the log.

Fifthly, and lastly, comes the Board of Trade. That Board has issued thousands of notices, and its surveyors are continually pouncing down on coal-laden ships and detaining them because they are not provided with *surface ventilation* and have not *cowls* on the tops of the ventilators, or because they are overloaded, or because the holds are so full of cargo that there is no room left

for surface ventilation. We have not, however, yet learnt that a Board of Trade Surveyor has detained a coal-laden ship on any of the following grounds :—

(*a.*) That thermometers and means of testing and recording the temperature of the various parts of the cargo are *not* provided.
(*b.*) That the cargo contains too much "small."
(*c.*) That the cargo has got damp.
(*d.*) That through ventilation *is* provided.
(*e.*) That closed-in receptacles exist on or below the upper deck which will hold coal gas if given off by the cargo.

All we have ever heard of the Board's officers doing is to see that there is space between the upper surface of the coal and the deck above it, and that surface ventilation is provided. It may be a question, but it is one on which we venture no opinion, whether those officers can be fulfilling their duty so long as they do not also see that thermometers, and facilities for inserting them into the cargo, are provided, and that *through* ventilation does *not* exist.

Finally :—

As regards *spontaneous combustion*, if it does break out on board after all precautions have been taken in selecting the coal and shipping it, and in securing the *absence* of everything like *through* ventilation, and the *presence* of a supply of thermometers and means for sounding and recording the temperature of the bulk of the cargo, and the *presence* of means for effectual *surface* ventilation; then we have the assurance of the Royal Commissioners that the only practical remedies are (1) steam or (2) water.

As regards the other of the two dreaded evils, viz., the *explosion of coal gas*, we may say now again that no space whatever in a coal-laden ship ought to be without ventilation. In the first place, *each* hold or compartment in which coal is carried should have two sufficient and efficient ventilators, not side by side, but one at each *end* of each such space, and so fitted and arranged that the one will carry off all gas from the *upper surface* of

the coal as well as the air which finds its way over its surface down the other one. Secondly, that means should be taken to prevent the captain's cabin, whether on deck or not, and all empty spaces into which a light may be taken, from becoming holders or receptacles for gas given off by coal. We may also mention two facts which are not sufficiently appreciated; the first is that mushroom ventilators are not so efficient as cowl ventilators, and the second is that as all gas and air below deck naturally flow towards the bows of a ship under weigh, the best way to secure a current of air over the surface of a coal cargo is to make the forward cowl in each compartment the exit for the gas, and the after cowl in each compartment the entry for air. To do this the forward cowl in each compartment should face aft, and the after cowl in each compartment should face forwards.

In concluding our present article we cannot do less than convey our thanks to the Wreck Commissioner for bringing the matter so prominently forward, and to our contributor for placing in the hands of the Wreck Commissioner the means for so doing. If it had not been for those services we should not have written the present article. Further, as we believe that this article was needed and is valuable, we have no doubt that our readers will be equally grateful with ourselves. We do trust, however, that no one will again be so ill-advised as to misquote the opinion of the editor and staff of the *Nautical Magazine* in such a way as to mislead the public into the belief that we hold any opinion except that it is an act amounting to criminal negligence for any person responsible for loading a ship with a cargo of coals, either to leave empty closed-in spaces into which the gas from coal can find its way, and in which dangerous receptacles it may be ignited; or to fail to provide sufficient and efficient means for complete surface ventilation of the cargo under all circumstances of weather, when the hatches are closed.

SHIP STEEL.

IN former articles we have described the introduction of mild steel for shipbuilding. It may be interesting to review the further progress which has been made during the present year in our knowledge of the qualities and capabilities of the new material, and also what has been done in the development of its manufacture. At the recent London meetings of the Iron and Steel Institute several papers were read upon the subject, and one, by Mr. Barnaby, of the Admiralty, gave rise to a spirited discussion upon the respective merits of Bessemer or converter steel and Siemens-Martin or open-hearth steel. These respective methods of manufacture we described in detail in a former number.* At present, all we need say is that the essential difference between the two methods is that in the Bessemer steel the composition of the metal is dependent to some extent upon the eye of the workmen or foreman; in the rival method it is possible, since the steel is under treatment a much longer time, to take out a sample, test it by chemical analysis, and so form an exact judgment as to the carbonization of the mass. The fact of the case is, however, while at some places where the Siemens-Martin process is used, samples are regularly taken out and tested, at others the result solely depends upon the respective quantities of material put into the furnace, the time being determined accordingly, and trial tests are never made. Mr. Barnaby complained that in several cases angle bars made from Bessemer steel had shown serious defects after having been bent.

"One 8 in. by 3 in. by 3/8 in. bar," he says, "broke through a rivet hole after it had been to form and annealed without any known cause. Another fractured in the 3 in. flange while being faired on the slab after annealing. Two others fractured in the 3 in. flange while being faired on the slab after annealing. One 4 in.

* *Nautical Magazine*, February, 1878, page 101.

by 3 in. by $\frac{3}{8}$ in. bar fractured in the 3 in. flange, when one end having been annealed the other end was about to be put in the furnace for annealing." Other similar cases were also remarked upon, it being stated that these bars had been treated much as iron bars would have been, except that whenever they had been bent hot, they had been afterwards annealed. The foremen in H.M. dockyards are instructed to bend all plates and bars cold which can possibly be so treated. If the whole length cannot be bent cold, only so much of the bar or plate as is absolutely necessary is to be heated, and all plates and bars which have been heated must afterwards be annealed over the parts which have been heated. Further, to dispense as much as possible with heating, the steel parts of the frame, which in an iron ship would be in one length, may be put in in short pieces, with butt straps. The Admiralty authorities, we are told, laid particulars of the failures of the steel before the manufacturers, who thereupon made some recommendations as to the treatment of the material, which we quote *in extenso.*

"In all cases where the bending of the bars cannot be completed whilst at a dull red heat, we would suggest that it be done at one or more heats according to the amount of bending required, so that the work may all be finished before the bar becomes black or cold.

"That all joggles should be made when the bars are hot, and that they should be annealed afterwards.

"That so far as is practicable, all bars that have been worked hot, should be passed through the annealing furnace before they are allowed to go cold, and this could be easily done with a furnace properly arranged for the purpose.

"That after the bars have been annealed they should not be heavily hammered, but if this is necessary they should be annealed again.

"That any setting of bars after annealing should, as far as possible, be done by hydraulic or other apparatus, so as to do away with the necessity of punishing the material with heavy hammers more than is absolutely necessary, and that this work be done by the smiths who bend the bars."

It is of course impossible to do all this in an ordinary shipyard,

and, if it be really necessary, the shipbuilder will be much better off with ordinary iron than with a material requiring to be thus coaxed and humoured at every turn. It must, however, be noted that all the failures were in connection with angle bars. Nothing of the kind has occurred with plates, in respect of which experience has much more than justified all anticipations of the advantages to be gained by the use of mild steel in shipbuilding. It was stated further that the angle bars which proved to be so defective, had passed the very stringent Admiralty tests, and had not, under those tests, shown any signs of defect. Mr. Barnaby remarked that so long as these characteristics of steel bars remain, the Admiralty will probably prefer iron. A very lengthy discussion took place upon the subject, in the course of which Mr. Martell, of Lloyd's, said that the Registry surveyors were well satisfied with the results of their further experience of the metal. He, however, expressed his surprise that the places in Chatham dockyard where the steel is worked were so much exposed to cold blasts of wind, and, on the whole, appeared to think that the dockyard people do not treat the steel tenderly enough, and are not sufficiently particular about annealing it. It appears to us pretty certain that unnecessary fuss has been made about the really small number of failures of Bessemer steel angle bars, but if steel manufacturers, or the chief surveyors of Lloyd's Registry, are trusting to the careful annealing of the metal after each heating operation, they cannot know too soon that they are trusting in a vain shadow. If there be any place where this could be done it is in a Royal dockyard, it cannot be done there, and certainly one could never rely upon its being done in places where discipline is necessarily less strict, and the workmen less under control. The case stands thus:—The new metal has such admirable qualities that only in perhaps one bar in a hundred or a thousand would it matter whether the annealing was done or not. The workmen know this, and thus have every temptation to be careless over an operation which they know to be unnecessary in a vast majority of cases, and the omission or imperfect performance of which will be almost certain to pass undetected.

It is within the knowledge of the writer, that so far from annealing being so carefully attended to as some have supposed, in one case in a yard where mild steel has been much used neither angle bars nor plates have ever been annealed at all, and the only precaution taken by the workmen is, that they are careful never to make the steel too hot, but it is sledge-hammered cold or at any intermediate temperature as may happen to be convenient.

Perhaps the complaints of the Admiralty authorities may be accounted for without much difficulty when a few of the facts of the case are stated. When the Admiralty used iron for shipbuilding they were so particular with their tests that they had to pay for their plates and angle bars about double the price paid by ordinary shipbuilders. The exigencies of ironclad design undoubtedly required in many cases a material which might without injury be tortured into shapes never dreamt of in the framing of merchant vessels. It is this special kind of iron which is now compared with mild steel, to the occasional disadvantage of the latter. On the other hand, Lloyd's have had practically no test for iron used in shipbuilding, except that it should stand the manipulation required to fit it for its place in the ship. Now, however, Lloyd's have prescribed tests as rigid as those used by the Admiralty, and hence one may easily understand that their views of the excellence of mild steel as compared with iron must differ from those of the Admiralty. With the former the change has been an unqualified gain, with the latter the advantage is, except in a pecuniary sense, still doubtful.

It is much to be regretted that in cases of the practical failures of Bessemer steel in H.M. dockyards the specimens have not been subjected to chemical analysis. The cause of defect may be altogether outside the question of the chemical composition, but it is important that the truth should be ascertained, and while we know what great differences in the qualities of steel are caused by comparatively small differences in its composition, it seems reasonable to suppose that defects may be due to that cause.

Mr. Adamson, of Sheffield, who has recently made a series of experiments on all kinds of steel, states that he found by analysis that while mild steel, which broke with a weight of twenty-nine tons

per square inch, contained one-tenth per cent. of carbon and a-half per cent. of manganese; the stronger kind of Bessemer bridge steel, which only breaks with a weight of 58·7 tons per square inch contained barely one-half per cent. of carbon, one and a-quarter per cent. of manganese, and one-thirteenth per cent. of silicon. Mr. Adamson has had large experience of the use of all kinds of Bessemer and also Siemens-Martin steel, and has for some years been engaged in experiments upon their properties, and he recently gave as the result of his experience that "comparing the results of the mechanical and chemical properties of the various metals, no other conclusion can be arrived at but that for every practical purpose, amongst some of the classes of Bessemer and Martin-Siemens, ductile and strong metals may be got to far exceed any wrought-iron that has ever been made, and greater security attained for every class of work to be done, and, in very many cases, at a much less cost; and such is the writer's experience after having used more especially the mild class of steel over the last twenty-one years, and having, at least, tested thirty to forty thousand specimens of steel suitable for boiler plates."

Passing on to a part of the question of much more interest to the shipowner, we are sorry to say that it appears pretty clear that, under conditions of not unfrequent occurrence, mild steel is much less durable than iron. The Admiralty experiments on the corrosion of steel, to which we have referred in a previous article,* have been further extended, and the result is that while steel plates, from which the black oxide or scale produced in rolling has been carefully removed, have been found to waste not any faster than iron, in cases where the scale has been only partially removed, it has been found that as strong galvanic action is set up between the scale and the steel plate as if a piece of copper had been attached to it. It has also been observed that iron rivets are electrically negative with regard to steel, and the latter is consequently liable to pitting near the rivets. This last difficulty

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* *Nautical Magazine*, January, 1879, p. 5.

might be obviated, and no doubt will be. Steel rivets have been used with success, and it certainly is desirable for many reasons that the whole of the metal in a ship shall be of the same character. As bearing upon this subject we may also mention the fact that when steel boiler tubes have been used in among iron ones, galvanic action has taken place, resulting in the early destruction of the steel tubes.

While, as we have said, the Admiralty now use mild steel for all ships built by them, in the Mercantile Marine few vessels have as yet been built of steel, except for services where speed and lightness are of the first consequence, and the owners are consequently prepared to pay a large price for them. In fact, mild steel so far has not come down in price to such an extent as to enable it to compete with iron for all classes of vessels. Its high price has been less owing to the expense of manufacture than to the fact that only high-class pig-iron can be used in the Bessemer process. This is owing to the fact, that by the ordinary Bessemer process, whatever phosphorus is in the pig, remains unaffected by the process of combustion caused by the blow, while the carbon and other impurities being burnt out, the phosphorus in the resulting metal is in a larger proportion than in the raw pig. There is at last some hope that by a recent invention phosphoric pig-iron may be used by a modification of the Bessemer method, and if good steel can be thus produced at a moderately increased cost for manufacture, its price will go down, and it will successfully compete with puddled-iron. In the words of the President of the Mechanical Section of the British Association at the recent meetings—" The result to the community will naturally be that, as henceforth a much more extended area of our iron fields both at home and abroad will become available for the production of steel, the use of that metal will be still further extended, and its price reduced mainly by means of the methodical researches of our scientific metallurgists, and entirely independently of those accidental combinations which have in less scientific days led to the adoption of new and improved methods in the production of metals required by the progress of mechanical and economic science."

The Bessemer process of steel making was described in the first article of this series.* The large vessel into which the molten iron is poured, and through which a blast of air is sent to cause the combustion of the carbon, &c., contained in the pig-iron, is known as the "converter." It is usually made of wrought-iron and is lined with a substance called *gainster.* The fact that the phosphorus is not got rid of as well as the other impurities has been attributed by many to the character of this lining, and it was believed that if a lining of another kind were used the phosphorus might be got rid of. Experiments were tried and it was found that with a lining containing a large proportion of lime, and also by throwing lime into the metal a considerable quantity of phosphorus was removed from the metal and passed into the refuse slag. The lining however would not stand, and a number of other experiments were made to ascertain a suitable lining of the required composition. This was at last obtained. It was found that bricks made from a magnesian limestone could be employed for the purpose, and the inventors believe that they have been successful in making steel from cheap pig-iron at a not unreasonable cost for manufacture. In this belief they are supported by many well-known authorities upon the question, but time will soon prove whether the invention is or is not an economical success. If it be, we may expect that a great impetus will be given to steel ship-building. The invention will indeed cut two ways, for if steel can be cheaply made from phosphoric pig, the latter will be in greater demand, and as a result puddled-iron made from it will rise in price as steel falls.

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* February, 1878, p. 101.

THE SWEDISH ARCTIC EXPEDITION BY THE WAY OF THE NORTH-EAST PASSAGE, AND THE TRADE WITH SIBERIA.

OUR readers will remember that in the May and June numbers of the Magazine we gave an account of Professor Nordenskiöld's voyage to explore the North-East Passage; and we were enabled to follow him until after he had rounded the northernmost cape of Asia. Of his subsequent progress past the New Siberia Islands, and the mouth of the Lena and Kolyma Rivers we heard nothing, until the news arrived that the *Vega* was fast in the ice near Cape Serdze, eastward of Kolyuchin Bay, and the accomplishment of the passage in one season was thus frustrated when the vessel was was within 70 or 80 miles of Behring Straits. We have now to record that after being imprisoned in the ice off the Tshuktshen settlement (with the natives of which Nordenskiöld was in constant communication) from the 28th of September, 1878, until 18th July last, the *Vega* was at last released. The onward route was then continued, the usual scientific observations pursued day by day, and several of the islands in and near Behring Strait visited. Thus the North-East Passage is an accomplished fact, and the Professor and his companions will have much to tell us on the subject. The *Vega* reached Yokohama on the 2nd of September; and no deaths had occurred during the voyage.

In respect to the *Trade with Siberia*, which Captain Wiggins, of Sunderland, was among the first to open up by the way of the Kara Sea and the Obi, it appears that the Russians are about to enter into it with some zest, and the Russian newspaper, *Novoe Vremya*, writes:—

"One of the most interesting events of the time is the attempt which is being made to build a Russian mercantile fleet in Siberia, as the most important commercial towns of Russia, St. Petersburg and Cronstadt, have scarcely any merchant navy, and leave the exportation of Russian goods to foreigners. A merchant of Moscow,

named Trapeonkcot, who last year successfully sent a steamer, built at Tjumen, to London, has this year again sent three newly-built vessels with Siberian goods to England. The captains and crews of the vessels were supplied by the Russian school of navigation. Should this fresh attempt be crowned with success, many Russian merchants, especially in Siberia and Moscow, will be sure to follow the example that has been set. The Kara Sea, by its geographical situation, will favour this commerce with vessels from Siberia. Every vessel built there easily finds cargo at the place where she is built, and by taking it to England in the course of two or three months has earned as much as she cost. Foreign vessels arriving at the Obi and Yenisei encounter there both economic and climatic hindrances. The entrance to the Kara Sea is free of ice so late that not only the mouths of the Obi and Yenisei, but even the Kara Sea itself, by reason of the warmer water flowing into it from the said rivers, are free of ice long previously. Vessels built in Siberia could be sold at a comparatively cheap rate in St. Petersburg and the other harbours of Russia, so that Russia would be relieved from the necessity of purchasing vessels in foreign countries."

GREENWICH HOSPITAL.

SOME little public discussion has recently taken place on the question of granting pensions to our aged merchant seamen, from the funds of Greenwich Hospital. A few words of historical survey, and of explanatory import thereon, may be serviceable to some of our readers.

In dealing with this subject we propose to treat briefly, in the first place, of the annals of the Hospital; secondly, of the funds accumulated, and contributions made thereto; and thirdly, of the recipients of the bounty of this noble institution; including, of course, the "Ancient Mariner" of the Mercantile Marine, and the Acts under which he is entitled to a pension.

As regards the Hospital itself, we may remind those of our

readers who know, and inform those who do not know, that it was formerly the site of one of the finest royal palaces. The town of Greenwich itself was called by the Romans, *Grenovicum*, and by the Saxons, *Grenawic*, or the Green Town. The first notice of a palace being erected there was in Henry VI. time, when Humphrey, Duke of Gloucester, who received a grant of land, erected a "tower in the parke, and called it his manor of pleasance." Edward IV. and Henry VII. improved it, as did also Henry VIII., who was born there. Other royal children first saw the light in the palace, amongst whom was "Good Queen Bess," who always displayed great partiality to the place of her birth. James I. was often at the palace, and his queen, Anne of Denmark, laid the foundation of what was termed the "House of Delight," in the park. It was finished by Henrietta Maria, queen of Charles I., who employed the famous Inigo Jones as the architect. It afterwards fell into decay, and at the Restoration, Charles II. ordered a new palace of free-stone. Only one wing was built, at a cost of £36,000. It is to the lasting honour of Mary, consort of William III., who originated the idea that an asylum should be constructed for aged and disabled seamen of the Royal Navy. Various sites were discussed, but Sir Christopher Wren's suggestion of the unfinished palace of Greenwich was adopted as the most suitable. In 1694, the grant was made to certain commissioners in trust, in the following words:—"To erect and found an hospital for the reliefe and support of seamen, serving on board the shipps or vessells belonging to the Navy Royal of us, our heirs or successors, or employed in our or their service at sea, who by reason of age, wounds, or disabilities, shall be incapable of further service at sea, and be unable to maintain themselves; and for the sustentation of the widows, and the maintenance and education of the children of seamen happening to be slaine or disabled in such sea service; and also for the reliefe and encouragement of seamen and improvement of navigation." The commissioners subscribed £8,000 towards the building, and Sir Christopher Wren gave his valuable services free in superintending the work. The king granted £2,000 per annum in aid of the works, to be paid "by exchequer tallies upon the post office, which nobody," adds the quaint Evelyn, "will take

at 30 per cent. discount." The foundation was laid on the 2nd June, 1696, and the buildings as then proposed were completed in two years. It was not, however, opened for the reception of seamen till 1705, when 100 were admitted to its bounty.

Various grants and bequests have been made from time to time, from public and private sources, towards the maintenance of this noble institution. In the early years of its history the effects of the notorious pirate, William Kidd, were allotted. They were valued at £6,472. In the time of George II., the forfeited estates of the Earl of Derwentwater and Mr. Radcliffe were awarded. The proceeds of those estates have risen enormously in value, and are still a large source of its revenue. But for upwards of a century a large proportion of it was derived from a monthly tax of 6d. on the wages of seamen in the Navy and Merchant Service. The first Act levying this sum was the 7 & 8 Wm. III., c. 21 (year 1694). The 7 & 8 Wm. III., c. 23, gave the Commissioners power to summons persons to give evidence as to liability. The 2 & 3 Anne, c. 6, exempted apprentices from the levy. The 10 Anne, c. 17, gave fuller powers of levying the tax, but exempted fishermen and small vessels trading in the rivers of Great Britain and Ireland. The 2 Geo. II., c. 7, extended the tax to the seamen in Jersey, Isle of Man, and British-American vessels. The 13 Geo. II., c. 31, put it on privateers, and fishermen appear to be again assessed, for by 2 Geo. III., c. 31, power is given to stop the bounty given by Parliament to men employed in the white herring trade if the Greenwich sixpence per month be not paid.

Pilots also would appear to have contributed, for by 52 Geo. III., c. 39, corporations are directed to send in lists of them annually to the Receiver of Greenwich Sixpences in London. The 4 & 5 Wm. IV., c. 34, repealed all the Greenwich Hospital Acts, from the 31st December, 1834, and, as £22,000 had been the average income, it voted £22,000 per annum out of the Consolidated Fund in lieu thereof, the first half-yearly payment to be made on the 5th July, 1835.

Originally the Hospital was open solely to seamen of the Royal Navy; but the 10 Anne, c. 27, provided that such of the merchant

seamen as may be wounded in the defence of property belonging to Her Majesty's subjects, or otherwise disabled whilst capturing vessels from an enemy, shall also be admitted. That was so far back as 1712, but it does not appear that the merchant sailor derived much or any benefit therefrom for many years, for we find that in 1747, a new scheme was started for his especial benefit. This was the Merchant Seamen's Fund, and it was authorised by the 20 Geo. II., c. 38. A levy of 6d. per month was made on the wages of all merchant seamen, excepting those in the employ of the East India Company of that day, which company had a fund of their own.

Thus, from 1747, the Mercantile Marine seaman had the privilege (!) of paying, *nolens volens*, one shilling per month, to two funds, one of which, that of Greenwich, he had the very smallest chance of getting any benefit from. The Act of 4 & 5 Wm. IV., c. 52, repealed the Act of 1747, and as the Greenwich Acts were then repealed, both from 31st December, 1834, a new levy for the Merchant Seamen's Fund, that is, the one established in 1747, was made. It amounted to 2s. per month for masters and navigating owners, and 1s. per month for seamen, apprentices being exempted. Five per cent. was chargeable for management, and another five per cent. was paid to the London Seamen's Hospital Society. This fund existed until 1851, when owing to gross mismanagement it was wound up, and the compulsory payment abolished. It was continued as a voluntary institution, and exists at the present day, and any master or seaman contributing at the above-mentioned rates is entitled, on leaving the sea service from old age or inability, to the munificent pension of £6 16s. and £3 8s. per annum respectively. This statement will show very rapidly the progress of the various seamen's funds for relief and for pensions. But our great object was to give a succinct account of the Greenwich Hospital Fund, and as it was considerably mixed with the other funds we have incidentally mentioned them. Coming back, however, to that fund, we find that it was abolished as a levy on wages from 31st December, 1834, and in lieu of the 6d. per month contribution, Parliament voted a certain sum. It

may be as well to mention that an Act for the better management of the Hospital and its affairs was passed as the 10 George IV., c. 25, but was almost wholly repealed in 1865 by the 28 & 29 Vict., c. 89.

This Act caused quite a revolution in the mode of conducting the establishment. The commission so long existing was abolished, together with the offices of Governor and Lieutenant-Governor. In lieu thereof a "Visitor" and "Governor" were appointed. But a more radical change was the provision for the seamen then in residence, who were to receive a pension instead of residing within its walls, and live outside where they chose to go. Hence Greenwich Hospital is no longer an asylum for the ancient mariner, but is now represented by a school, a show place of architecture, of painting, and curiosities, with a wing devoted to the care and cure of invalid seamen of all nations, since the abolition of the floating hospital on the Thames called the *Dreadnought*. That division is however supported entirely by its own particular funds.

The 5th Section of the Act of 1865 enacts, that "It shall be lawful for Her Majesty in Council from time to time, by Order in Council, to appoint such pensions as seem fit to officers, non-commissioned officers, and men of the Royal Navy and Marines, and seamen of the *Merchant Service* for the time being entitled to the benefits of Greenwich Hospital, to be enjoyed by them so long only as they are not on the establishment or inmates of Greenwich Hospital, but in addition to any half-pay, pension, or other allowance coming to them otherwise than under such Order in Council; and to prescribe the conditions on which such pensions are to be held, and to appoint such gratuities as seem fit to widows of non-commissioned officers and men of the Royal Navy and Marines killed or drowned in the service of the Crown."

This extract will show precisely the legislative power now taken of granting pensions. The next Act of importance is that of 1869, by which the Admiralty is empowered to pay to the Board of Trade the sum of £4,000 per annum out of the Consolidated Fund for the purpose of granting certain pensions to masters and seamen of the Merchant Service. The amount was ordered to be repaid

out of the Greenwich Hospital Funds, and the regulations under which the pensions were to be granted were fixed by Order in Council of 7th October, 1869. The next step was the Act of 1870, amending the law regarding repayment of the above amount to the Exchequer by quarterly sums. But the more important Act to the merchant seamen is that of 1872, being the 35 & 36 Vict., c. 67; under it, by section 2, power is conferred in order to grant annuities in lieu of pensions to merchantmen. These annuities are not to exceed the amount of pension prescribed by the Act of 1869, and are purchasable from the National Debt Commission under the Savings Bank Annuities Act. In the Act of 1869 the gross amount granted was £4,000 per annum; but there is no fixed sum named in that of 1872, and hence, every eligible person complying with the regulations, is entitled. These regulations will be noticed further on.

The amounts presented for the purchase of annuities are taken from the Greenwich Hospital Funds, and in one year, 1873-1874, they amounted to £36,000. That was the largest sum yet voted in one year, and last year it only amounted to £4,000.

Turning to the second division of the subject, namely, the funds accumulated and contributions made, what do we find? A glance at one or two Parliamentary Returns will show. The first one of salient importance is entitled, "Accounts of the Receipt and Expenditure of the Capital and of the Income derived from lands and other property held for the benefit of Greenwich Hospital for the year ended 31st March, 1878." This valuable document shows at a glance the capital realized on the estates, &c., and also the income and expenditure on account of the institution. To give a brief summary of the "capital" account, it may be stated thus:—

	£	s.	d.
Money on loan	656,519	15	11
Invested in consols	2,153,485	1	8
Invested in Indian Stock ...	662,340	0	0
Invested in Canadian Bonds ...	40,000	0	0
	£3,512,344	17	7

So that a sum of more than three and a-half million pounds sterling appears to be in the possession—the absolute possession—of the Hospital. To show also the rapidity with which that capital is increasing, a glance at the corresponding account for March 31, 1871, or, only seven years previously, will show that no less a sum than £713,250 14s. 5d. was the net increase. It seems almost incredible that three-quarters of a million should be saved or gained in so short a period.

The income and expenditure of the estate also show a striking result. In the year ended 31st March, 1878, there were received for dividends, interest, transfers, &c., £178,100 19s. 5d., and which showed an increase of £3,868 7s. 6d. on the corresponding year ended 31st March, 1871. The above-noted account may be said to show the stock-in-trade of Greenwich Hospital Estate, and an exact account of its profits and loss by a balance-sheet founded on "double entry." But there is another financial statement of some interest, and which shows certain items more in detail than the other. In order, probably, to exercise a constitutional control on the expenditure of so large a sum, and which was done in the national interest,—at least for a national institution,—Parliament voted the sums required in detail for expenses of management at Greenwich, pensions, school, &c. It is called the "Appropriation Account of the sum granted by Parliament for Greenwich Hospital and School, for the year ended 31st March, 1878." The amount voted was £142,385, and the expenditure for hospital, painted chapel, school, pensions, &c., amounted to £140,987 18s. 9d. This was a sum of £7,492 3s. 8d. over the expenditure for the similar year ended 31st March, 1871. To a person who did not know of the existence of the first account, it might seem as if the House of Commons found the money to meet the outgoings; or, to a person who had not studied the matter, it might seem that two similar sums — one from the estate and another from the Consolidated Fund—were received. But a little explanation will soon clear up the matter. It is provided, by the Act of 1870, which amends a former Act, that one-fifth of the amount provided by Parliament shall be paid quarterly from the Greenwich Hospital Income Account into the receipt of Her

Majesty's Exchequer. At the end of the year, of course, this would only represent four-fifths of the sum voted and might be less or more than the amount expended. To meet this difficulty it is provided that the balance, either way, shall be adjusted at the year's end upon a certificate being received from the Comptroller and Auditor General. It will be apparent, therefore, that the amount voted is merely for the sake of Parliamentary control, and that it is all repaid from the rich funds of Greenwich Hospital Estate.

Now, the question naturally arises, how did all these riches accumulate? So far as we can gather, they arose from several sources. First, the 6d. per month contributed by the sailors; second, from the forfeited estates of the Earl of Derwentwater, Mr. Radcliffe, and from other Governmental endowments; thirdly, from private bequests. The estates—the Northern Estates as they are called—accumulated and enhanced in value as time rolled on, by judicious investments of surplus income. The amount of money received from the seamen has been enormous and is to be counted by millions. Mr. Gourley, member for Sunderland, recently asked the Government if it was not true that two millions had been subscribed by the merchant seamen without their receiving any benefit. Mr. Smith, on behalf of the Government, stated that it was impossible at this time to calculate the amount. That may be true to a certain extent, but an approximation could be arrived at. For instance, the 6d. was collected for 140 years from the seamen of the Navy and of merchant ships. It would be a long task to take the archives of the Admiralty and rake up the number of men enrolled year by year, and thus to ascertain the sums due. It would be a long and laborious job, and would not probably result in mathematical precision. If, however, we consider that, in 1694, at the starting of the fund, there were estimated to be about 40,000 seamen in the Navy; that, in 1760, there were about 70,000; that, in 1800, there were 135,000; that, in 1814, there were 146,000; and in 1834, about 44,000. Taking an average between these periods it cannot be far off to fix it at about 60,000, which number at 6d. per month, for 140 years, would give the rather decent sum of £2,520,000.

Turning to the merchant ships it will not do to assess them in the same way as for the Navy men, who are usually employed all the year round. In a Parliamentary Committee's Report, dated July, 1844, it is stated that merchant seamen, as a rule, are not employed more than five months in the year. This is certainly not the case in these hard working days, but it may have been so in the "good old times." Now, it is estimated that there were 400,000 tons of shipping belonging to the United Kingdom about the end of the 17th century. It is impossible to say to a ton because no registration of shipping took place till 1877. Well, estimating the old style of sailing ship to be sailed with a crew of six to the 100 tons, that would give 24,000 men as forming the Mercantile Marine crews of that date. Now, in 1834, it is recorded that 150,000 seamen were afloat in our ships. Taking an average between the two, that is, supposing a gradual rise had taken place in the possession and building of our ships, it will be obvious that 87,000 men must have paid the 6d. per "mensem" for 140 years. But, if the average employment was only five months annually, then only 2s. 6d. per year would be paid per man. This would yield a sum of £1,522,500 as the total amount contributed. A sum not far off the two millions mentioned by Mr. Gourley in the House of Commons on the 24th July last. But, seeing that little benefit has been derived by our merchant seamen, from this fund — the main amount of it having been expended on Navy men—it would not be unfair, although no doubt it is not feasible, to calculate the simple interest upon this huge sum, and add it thereto. To talk of compound interest, would make it something incredible. But the simple interest alone would amount to above three millions sterling, so that it will be seen that our "Ancient Mariner" of the Mercantile Marine has a fair claim upon the consideration of the Government of the day. This we propose to discuss under the third division of the subject in hand.

In noticing in the third place the recipients of the Greenwich Hospital Funds, perhaps the readiest way to understand this division would be to take an extract from what is termed the "Appropriation Account." The last published is dated 17th February, 1879. It shows, in a summary manner, the amounts

expended under various heads, which are marked alphabetically. Passing A to G, which are for various salaries, expenses, superannuations, &c., and are of minor amount, we come to the letter H, which is for pensions to flag and other officers. It amounts to £5,602 9s. 11d.

The sum of £73,558 5s. 11d., for pensions to seamen and marines—of the Navy, of course—is under I. It comprehends more than half of the whole expenditure. Under the next letter, K, we have special pensions to seamen and marines, amounting to £19,494 5s. 4d. The letter L costs £8,753 10s. 1d. for maintenance of men in naval hospitals; whilst M is represented by a blank space, on account of the merchant seamen. This we will explain further on. Meanwhile, it is interesting to note that between six and seven thousand pounds are expended in what might be termed the management expenses; about twenty-three thousand pounds upon the school, at which a few children of merchantmen are educated; and the rest, about one hundred and twelve thousand are expended in pensions, as above stated. Gratuities to widows of seamen and marines, maintenance of daughters of same at schools or "Homes," and so forth. It will therefore be seen that, for the two millions or so contributed by the Navy men, they derive the lion's share of the benefit. With regard to the merchant seamen, we have a clear statement of amounts awarded to them under recent Acts. The account will be found in a foot-note attached to Parliamentary Papers 109, for present session. It is summarized thus:—

1. Amount paid out of Greenwich Hospital votes in pension to merchant seamen, under the Act of 1869:—

	£	s.	d.
1869-70	188	0	11
1870-71	5,649	5	9
1871-72	3,840	7	3
1872-73	3,813	18	1
1873-74	3,290	13	2
1874-75	135	3	7
1875-76	26	12	0
1876-77	Nil.		
1877-78	Nil.		
Total	£16,944	0	9

2. Amount advanced to Board of Trade out of Greenwich Hospital Funds, for purchase of annuities to merchant seamen entitled to pensions under Act of 1872:—

		£	s.	d.
1872-73	... ...	20,000	0	0
1873-74	... ...	36,000	0	0
1874-75	... ...	27,000	0	0
1875-76	... ...	7,400	0	0
1876-77	... ...	10,000	0	0
1877-78	... ...	11,000	0	0
1878-79 to 31st January, 1879	...	4,000	0	0
		*£115,400	0	0

Under the Act of 1869, a fixed sum of £4,000 per annum was voted for this purpose; and an Order in Council laid down the following regulations:—

That pensions to merchant-men will only be awarded—

1. To masters and seamen who have paid 6d. per month to Greenwich Hospital Fund, at least five years before 1st January, 1835.

2. To masters and seamen who are disabled by age, and not less than 55 years of age.

3. That the amount will be limited to £3 8s. per annum.

4. Pensioners from Merchant Seamen's Fund not entitled unless they have less than £3 8s. per annum from that source.

5. Granted first to those who can prove most service—but total not to exceed £4,000 a-year.

This system continued until 1872, when the Act of that year, 35 & 36 Vict., c. 67, seems to give a right of pension or annuity to any seaman who can comply with the regulations of the Order in Council, as above given. The principle of the Post Office Annuity system was therein adopted, and appears to have been pursued since. The pensions-proper granted after that Act was passed have been comparatively small in amount, as a reference to the figures above will reveal.

* Mr. Smith, in his speech of the 24th July, puts the amount down at £143,400.

The mode of calculation adopted by the Post Office Tables is as follows :—

Table 4 shows that a person at the age of sixty would require to pay £14 10s. 7d., to secure an annuity of £1 per annum till death. For a pensioner of £3 8s. at that age, the sum of £51 8s. would be required to be paid. Hence, about 700 seamen must have been added to the pension in 1873-74 year, when £36,000 was voted. Last year, only eighty or so would get it, taking this mode of calculation as a basis, for only £4,000 appears to have been awarded.

Well, it is one step of progress when we find *all* who are entitled and can prove their claim, getting the benefit. But as hundreds cannot prove the technicalities required, it would be a still more graceful act if the regulations were again relaxed. Ten years ago, it was a comparatively easy thing for men retiring or retired from sea to prove that the monthly 6d. had been paid. Now, in 1879, it requires a proof of fifty years, which must be a difficult if not an almost impossible matter. If, for example, instead of five years' proof before 1835 being required, one year only were the condition. How many poor old fellows would have the pittance, and feel themselves blest ? For it does not take much to make a hardy old tar happy and contented. The hardships of his lot have rendered him innocuous to suffering, and hard fare has inured him to live at the minimum expense.

There are some thousands receiving this annuity now, which, however small, is a comfort to them in their extremity. It is fairly reasonable to suppose that were the period of proof of payment reduced to one year, hundreds more of the Ancient Mariner class would soon be able to take advantage of its provisions. Mr. Gourley did good service on the 24th July last, in asking the question he did on behalf of these helpless old seamen, but he got little reward for his pains further than a dry statement of facts. Mr. W. H. Smith, First Lord of the Admiralty, stated that £22,000 per year was the average amount received from the Merchant Seamen at and previous to 1834 ; that it was not possible to give the aggregate amount received from 1694 to 1834. Perhaps not to a fraction, but it must be obvious that if £22,000

was the amount of receipt, then a sum greater than the two millions mentioned by Mr. Gourley must have been received. He said there was no right existing to a pension from this source. Very likely not, in a technical sense, but, is there no moral claim? We think so, after so much money has been contributed—the funds being flourishing, and the contributors poor and wretched, surely, under such circumstances, a great nation should feel it a sense of obligation to extend its charity and aid. Mr. Smith further stated that the institution of the 6d. levy was made because of the protection afforded by the Navy to commerce. Now, such a lame and impotent conclusion, we venture to say, was never made from very slender premises. The idea of Queen Mary, so far as we can divine, was to afford relief to disabled seamen of the Navy. There was difficulty in getting funds, and the 6d. contribution was levied upon both the Navy and merchantmen, but, to compensate the latter, they were made beneficiaries in the event of them being disabled by fight. In this, theoretically they were put on a level with the Navy men, for even the latter were only to get the benefits of the Hospital in the event of such disablement, and then only in special cases. We are glad to be able to note by one part of the First Lord's speech, that *some* benefit has been, in the past, afforded to the merchant seaman, and the mere fact of it being given shows that a claim, if only a moral one, existed on their part. The information is put in this way: that of 2,170 men in the hospital in 1834, upwards of 1,000 had been in the Merchant Service for an average time of 13 years. But he does not state how many of these men had joined the Navy from the Merchant Service, and hence obtained the benefit of the asylum.

The amount of benefit, estimating it at its best, derived by our merchant seamen pure and simple, after giving about two millions of their hard earnings to it, may be summarized thus:—A few admitted to the hospital; a few of their children admitted to the school; and the small pension of £3 8s. allotted since 1869.

Reverting to the statement of Mr. Smith, regarding the reason for levying the 6d., it seems to us most illogical to argue as he did. To make such a levy as a compensation for the protection

afforded by the Navy to one section of the community, would have been contrary to the principles of Political Economy. The ultimate benefit of such a protection would come to the nation at large, for whom the great Mercantile Marine existed, and to charge the seamen with the cost of such protection was to add to their individual risk and cost. For in working the Mercantile Marine, they underwent hardships and dangers for the purpose of conferring the profits of commerce and the benefits of foreign produce upon the country. For this service, specially onerous and hazardous, they merely exacted the market value of their services, which was no more than the labourer on shore did. Surely then, to saddle these poor men with the part cost of the protection afforded by the Navy to the ships of their owners, and the cargoes of the merchants, was neither in keeping with the principles of Political Economy nor of simple justice to the seamen. And, therefore, to say that they have no claim upon the fund is hardly fair.

COLLISIONS AT SEA.—NEW REGULATIONS.

[The following is the text of the Order in Council enacting new regulations for preventing collisions at sea, which it will be observed are to take effect on and after the 1st September, 1880. We take the opportunity of calling attention to the fact that on and after the 1st January next, all candidates for certificates of competency will be required to pass an examination in these new rules.—Ed.]

At the Court at Osborne House, Isle of Wight, the 14th day of August, 1879. Present, the Queen's most Excellent Majesty in Council.

Whereas, by "The Merchant Shipping Act Amendment Act, 1862," it was enacted, that on and after the first day of June, one thousand eight hundred and sixty-three, or such later day as might be fixed for the purpose by Order in Council, the Regulations contained in the Table marked C in the Schedule to the said

Act should come into operation and be of the same force as if they were enacted in the body of the said Act; but that Her Majesty might from time to time, on the joint recommendation of the Admiralty and the Board of Trade, by Order in Council, annul or modify any of the said Regulations, or make new Regulations in addition thereto or in substitution therefor; and that any alterations in, or additions to, such Regulations made in manner aforesaid should be of the same force as the Regulations in the said Schedule:

And whereas, by the same Act, it was further provided, that whenever it should be made to appear to Her Majesty that the Government of any foreign country was willing that the Regulations for preventing collisions contained in Table C in the Schedule to the said Act, or such other Regulations for preventing collisions as are for the time being in force under the said Act, should apply to the ships of such country when beyond the limits of British jurisdiction, Her Majesty might, by Order in Council, direct that such Regulations should apply to the ships of the said foreign country, whether within British jurisdiction or not; and it was further provided by the said Act, that whenever an Order in Council had been issued applying any Regulation made by or in pursuance of the said Act to the ships of any foreign country, such ships should, in all cases arising in any British Court, be deemed to be subject to such Regulation, and should, for the purpose of such Regulation, be treated as if they were British ships:

And whereas, by an Order in Council made in pursuance of the said recited Act, and dated the ninth day of January, one thousand eight hundred and sixty-three, Her Majesty was pleased to direct: —First, that the Regulations contained in the Schedule to the said Act should be modified by the substitution for such Regulations of certain Regulations appended to the said Order;

Secondly, that the said Regulations appended to the said Order should, on and after the first day of June, one thousand eight hundred and sixty-three, apply to French ships, whether within British jurisdiction or not:

And whereas, by several Orders in Council subsequently made, Her Majesty was pleased to direct that the Regulations appended

to the said Order of the ninth of January, one thousand eight hundred and sixty-three should apply to ships of the countries specified in the said Orders, whether within British jurisdiction or not:

And whereas, by Order in Council, dated the thirtieth day of July, one thousand eight hundred and sixty-eight, Her Majesty, on the joint recommendation of the Admiralty and the Board of Trade, was pleased to make certain additions to the Regulations appended to the said first-recited Order in Council, for the purpose of explaining Articles 11 and 13 of the said Regulations, and of removing doubt and misapprehension concerning the effect of the said two Articles:

And whereas the Admiralty and the Board of Trade have jointly recommended to Her Majesty, that the Regulations contained in the Order in Council, dated the ninth day of January, one thousand eight hundred and sixty-three, and the additions to the said Regulations contained in the said Order in Council of the thirtieth day of July, one thousand eight hundred and sixty-eight, shall be annulled from the first day of September, one thousand eight hundred and eighty, and that there shall be substituted for the said Regulations and additions respectively the new Regulations hereinafter set forth:

And whereas it has been made to appear to Her Majesty that the Governments of the several foreign countries mentioned in the second schedule hereto are respectively willing that the Regulations contained in the first schedule hereto shall apply to ships of the said countries respectively whether within British jurisdiction or not:

Now, therefore, Her Majesty, by virtue of the powers vested in Her by the said recited Act, and by and with the advice of Her Privy Council, is pleased to direct:—

First, that on and after the first day of September, one thousand eight hundred and eighty, the Regulations appended to the said Order in Council of the ninth day of January, one thousand eight hundred and sixty-three, and the additions to the said Regulations contained in the said Order in Council of the thirtieth day of July, one thousand eight hundred and sixty-eight, shall be annulled, and that there shall be substituted for the said Regulations and

additions respectively the new Regulations contained in the first schedule hereto.

Second, that the said Regulations contained in the said first Schedule hereto shall, from and after the first day of September, one thousand eight hundred and eighty, apply to ships of the Countries mentioned in the said second schedule hereto whether within British jurisdiction or not.

C. L. PEEL.

FIRST SCHEDULE.

Regulations for Preventing Collisions at Sea.

Preliminary.

Art. 1. In the following rules every steam ship which is under sail and not under steam is to be considered a sailing ship; and every steam ship which is under steam, whether under sail or not, is to be considered a ship under steam.

Rules concerning Lights.

Art. 2. The lights mentioned in the following Articles, numbered 3, 4, 5, 6, 7, 8, 9, 10, and 11, and no others, shall be carried in all weathers, from sunset to sunrise.

Art. 3. A seagoing steam ship when under way shall carry;

(*a.*) On or in front of the foremast, at a height above the hull of not less than 20 feet, and if the breadth of the ship exceeds 20 feet then at the height above the hull not less than such breadth, a bright white light, so constructed as to show an uniform and unbroken light over an arc of the horizon of 20 points of the compass; so fixed as to throw the light 10 points on each side of the ship, viz., from right ahead to two points abaft the beam on either side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles.

(*b.*) On the starboard side, a green light so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to 2 points abaft the

beam on the starboard side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

(*c.*) On the port side, a red light, so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to 2 points abaft the beam on the port side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

(*d.*) The said green and red side lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

Art. 4. A steam ship, when towing another ship, shall, in addition to her side lights, carry two bright white lights in a vertical line one over the other, not less than three feet apart, so as to distinguish her from other steam ships. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light which other steam ships are required to carry.

Art. 5. A ship, whether a steam ship or a sailing ship, when employed either in laying or in picking up a telegraph cable, or which from any accident is not under command, shall at night carry in the same position as the white light which steam ships are required to carry, and, if a steam ship, in place of that light, three red lights in globular lanterns, each not less than 10 inches in diameter, in a vertical line one over the other, not less than three feet apart: and shall by day carry in a vertical line one over the other, not less than three feet apart, in front of but not lower than her foremast head, three black balls or shapes, each two feet in diameter.

These shapes and lights are to be taken by approaching ships as signals that the ship using them is not under command, and cannot therefore get out of the way.

The above ships, when not making any way through the water, shall not carry the side lights, but when making way shall carry them.

Art. 6. A sailing ship under way, or being towed, shall carry the same lights as are provided by Article 3 for a steam ship under way, with the exception of the white light, which she shall never carry.

Art. 7. Whenever, as in the case of small vessels during bad weather, the green and red side lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for use; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side.

To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the colour of the light they respectively contain, and shall be provided with proper screens.

Art. 8. A ship, whether a steam ship or a sailing ship, when at anchor, shall carry, where it can best be seen, but at a height not exceeding 20 feet above the hull, a white light, in a globular lantern of not less than eight inches in diameter, and so constructed as to show a clear uniform and unbroken light visible all round the horizon, at a distance of at least one mile.

Art. 9. A pilot vessel, when engaged on her station on pilotage duty, shall not carry the lights required for other vessels, but shall carry a white light at the mast head, visible all round the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed fifteen minutes.

A pilot vessel, when not engaged on her station on pilotage duty, shall carry lights similar to those of other ships.

Art. 10. (*a*.) Open fishing boats and other open boats when under way shall not be obliged to carry the side lights required for other vessels; but every such boat shall in lieu thereof have ready at hand a lantern with a green glass on the one side and a red glass on the other side; and on the approach of or to other vessels, such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall

not be seen on the port side, nor the red light on the starboard side.

(*b.*) A fishing vessel, and an open boat, when at anchor, shall exhibit a bright white light.

(*c.*) A fishing vessel, when employed in drift net fishing, shall carry on one of her masts two red lights in a vertical line one over the other, not less than three feet apart.

(*d.*) A trawler at work shall carry on one of her masts two lights in a vertical line one over the other, not less than three feet apart, the upper light red, and the lower green, and shall also either carry the side lights required for other vessels, or, if the side lights cannot be carried, have ready at hand the coloured lights as provided in Article 7, or a lantern with a red and a green glass as described in paragraph (*a.*) of this Article.

(*e.*) Fishing vessels and open boats shall not be prevented from using a flare-up in addition, if they desire to do so.

(*f.*) The lights mentioned in this Article are substituted for those mentioned in the 12th, 13th, and 14th Articles of the Convention between France and England scheduled to the British Sea Fisheries Act, 1868.

(*g.*) All lights required by this Article, except side lights, shall be in globular lanterns so constructed as to show all round the horizon.

Art. 11. A ship which is being overtaken by another shall show from her stern to such last-mentioned ship a white light or a flare-up light.

Sound Signals for Fog, &c.

Art. 12. A steam ship shall be provided with a steam whistle or other efficient steam sound signal, so placed that the sound may not be intercepted by any obstructions, and with an efficient fog horn to be sounded by a bellows or other mechanical means, and also with an efficient bell. A sailing ship shall be provided with a similar fog horn and bell.

In fog, mist, or falling snow, whether by day or night, the signals described in this Article shall be used as follows; that is to say,

(*a.*) A steam ship under way shall make with her steam whistle, or other steam sound signal, at intervals of not more than two minutes, a prolonged blast.

(*b.*) A sailing ship under way shall make with her fog horn, at intervals of not more than two minutes, when on the starboard tack one blast, when on the port tack two blasts in succession, and when with the wind abaft the beam three blasts in succession.

(*c.*) A steam ship and a sailing ship when not under way shall, at intervals of not more than two minutes, ring the bell.

Speed of Ships to be moderate in Fog, &c.

Art. 13. Every ship, whether a sailing ship or steam ship, shall in a fog, mist, or falling snow go at a moderate speed.

Steering and Sailing Rules.

Art. 14. When two sailing ships are approaching one another so as to involve risk of collision, one of them shall keep out of the way of the other, as follows, viz.:—

(*a.*) A ship which is running free shall keep out of the way of a ship which is close-hauled.

(*b.*) A ship which is close-hauled on the port tack shall keep out of the way of a ship which is close-hauled on the starboard tack.

(*c.*) When both are running free with the wind on different sides, the ship which has the wind on the port side shall keep out of the way of the other.

(*d.*) When both are running free with the wind on the same side the ship which is to windward shall keep out of the way of the ship which is to leeward.

(*e.*) A ship which has the wind aft shall keep out of the way of the other ship.

Art. 15. If two ships under steam are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other.

This Article only applies to cases where ships are meeting end

on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two ships which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are, when each of the two ships is end on, or nearly end on, to the other; in other words, to cases in which, by day, each ship sees the masts of the other in a line, or nearly in a line, with her own; and by night, to cases in which each ship is in such a position as to see both the side lights of the other.

It does not apply by day, to cases in which a ship sees another ahead crossing her own course; or by night, to cases where the red light of one ship is opposed to the red light of the other, or where the green light of one ship is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

Art. 16. If two ships under steam are crossing, so as to involve risk of collision, the ship which has the other on her own starboard side shall keep out of the way of the other.

Art. 17. If two ships, one of which is a sailing ship, and the other a steam ship, are proceeding in such directions as to involve risk of collision, the steam ship shall keep out of the way of the sailing ship.

Art. 18. Every steam ship when approaching another ship, so as to involve risk of collision, shall slacken her speed or stop and reverse, if necessary.

Art. 19. In taking any course authorised or required by these Regulations, a steam ship under way may indicate that course to any other ship which she has in sight by the following signals on her steam whistle, viz.:—

One short blast to mean "I am directing my course to starboard":

Two short blasts to mean "I am directing my course to port":

Three short blasts to mean "I am going full speed astern."

The use of these signals is optional; but if they are used, the course of the ship must be in accordance with the signal made.

Art. 20. Notwithstanding anything contained in any preceding

Article, every ship, whether a sailing ship or a steam ship, overtaking any other, shall keep out of the way of the overtaken ship.

Art. 21. In narrow channels every steam ship shall, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such ship.

Art. 22. Where by the above rules one of two ships is to keep out of the way, the other shall keep her course.

Art. 23. In obeying and construing these rules due regard shall be had to all dangers of navigation; and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

No Ship, under any Circumstances, to neglect proper precautions.

Art. 24. Nothing in these rules shall exonerate any ship, or the owner, or master, or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper look-out, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

Reservation of Rules for Harbours and Inland Navigation.

Art. 25. Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbour, river, or inland navigation.

Special Lights for Squadrons and Convoys.

Art. 26. Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal lights for two or more ships of war or for ships sailing under convoy.

SECOND SCHEDULE.

Austro-Hungary.	Italy.
Belgium.	Netherlands.
Chili.	Norway.
Denmark.	Portugal.
France.	Russia.
Germany.	Spain.
Great Britain.	Sweden.
Greece.	United States.

LIGHTS OF FISHING VESSELS.

"BESSIE" AND "JANE."

THE decision of the Court of Inquiry which recently investigated the circumstances attending the loss of the fishing vessel *Jane* is of especial importance, so far as the lights of fishing vessels are concerned. The following extract from the report of the Inquiry gives that portion of the decision of the Court which deals with this subject, and should be carefully perused by those who are interested in fishing boats and their lights :—

"Now the light on board the *Jane* was, we are told, the same as is usually carried by all fishing boats. It consisted of a composite candle set in a square lantern with glass sides. The lantern was placed in a kind of cage on the top of an iron stanchion, which was held in an upright position by two sockets fixed in the port side of the boat about midships. The lantern when in position stood about 3 feet above the rail. A lantern with its iron cage and stanchion, similar we are told in all respects to that which was on board the *Jane*, save that the lantern on board the *Jane* had a perforated funnel at the top, which enabled the light to burn more steadily, was brought into Court. Now on examining the lantern with its accompanying fittings, what struck us at once was that owing to its form a great deal of the light from the candle inside must have been obstructed. Thus the glasses, which formed the sides of the lantern, were set in an iron framework, having a broad iron band at each angle; in addition to this the top of the cage, in which the lantern was placed, consisted of another large broad band, which encircled the lantern horizontally about the middle ; there were also other broad bands forming the supports of the cage which passed vertically down the centre of each face of the lantern. All these broad iron bands would certainly tend to obstruct a good deal of the light whatever may have been the amount of its illuminating power, and would prevent it from showing 'a clear uniform and unbroken

light all round the horizon,' which is what an anchor light is required to do. As to the light itself we are told by Gandin that when he lighted it at 10 o'clock it consisted of about three parts of a composite candle, and that it would burn for four or five hours. If so, there is every reason to suppose that at 1 o'clock, when the collision occurred, it would still be alight; but whether such a candle would be likely to give a sufficient light is a question, which may be more conveniently considered when we see what is the character of the light, which the regulations require fishing boats to carry. Its position, too, must not be forgotten, which, as I have stated was, amidships, on the port side, and standing about 3 feet above the rail; so that to a vessel approaching her from the starboard side, apart from the broad iron bands, of which I have spoken, there would be very considerable risk that the light might be obscured by the mainmast.

"And now let me endeavour to answer the question upon which our opinion has been specially asked by the Board of Trade, namely, whether a light such as I have described is or is not such as is required by Article 9 of the Regulations for Preventing Collisions at Sea. The words of the Article, so far as they bear upon the present case, are as follow:—'Fishing vessels and open boats, when at anchor, or attached to their nets and stationary, shall exhibit a bright white light.' Now what is a 'bright white light' within the meaning of this Article, and at what distance is it required to be seen? There is no definition of it in this Article, and the only other places in the Regulations where they speak of a 'bright white light' is in Article 3 (*a*) and in Article 4, where the lights which steamships when under weigh are required to carry at their mastheads are defined. Now in Article 3 (*a*) it is said that this 'bright white light' is to be 'of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least five miles.' Where, however, the Regulations speak of the lights to be carried by 'ships, whether steamships or sailing ships, when at anchor in roadsteads or fairways,' it is said in Article 7 that they are to exhibit a 'white light,' not a 'bright white light,' and that it shall be placed 'in a globular lantern of 8 inches in diameter, and so constructed as to show a clear

uniform and unbroken light all round the horizon, and at a distance of at least one mile.' If now we are to apply the strictest principles of construction, seeing that the expression 'bright white light,' and not merely 'white light,' has been used in the 9th Article, we ought perhaps to hold that fishing boats are bound 'when at anchor or attached to their nets and stationary' to exhibit a light, which would 'be visible on a dark night with a clear atmosphere at a distance of at least five miles;' but that would be imposing upon them a greater burden than is required of steam and sailing ships at anchor. On the other hand, if we are to take the definition of a 'white light' given in Article 7, as explaining what is meant by the 'bright white light' mentioned in Article 9, then not only must it be visible 'at a distance of at least one mile,' but must be 'so constructed as to show a clear uniform and unbroken light visible all round the horizon,' which the *Jane's* light certainly did not do. In default then of any definition of what the light is to be which fishing boats are to carry, except that they are to be 'bright white lights,' let us see whether the light exhibited by the *Jane* on the occasion, assuming it to have been alight, was a sufficient light; and the assessors are of opinion that it was not. They think that a fishing boat being a very small object, and not so readily seen as a larger vessel, ought to have at least as good a light as that required by the 7th Article for ships at anchor; and they are of opinion that the lantern exhibited by the *Jane* with its broad bands of iron obstructing the light, and its composite candle, did not constitute a sufficient light for her. They think that it is very doubtful whether under the best conditions it could have been seen at the distance of a mile, and that it certainly would not show a 'clear uniform and unbroken light visible all round the horizon.'"

WEATHER FORECAST FOR OCTOBER, 1879.

The Currents or Tendency of the Air over the British Islands for the Month of October, 1879.

Date.	Duration.	Force from		General Direction from	Duration.	Force from		General Direction from
Oct.		N. or S.	E. or W.			N. or S.	E. or W.	
1	6 h.m. to 1 h.a.	10½	4	S.S.W.	1 h.a. to 7 fol. m.	5	2	N.N.W.
2	7 m. „ 2 a.	9½	5	„	2 a. „ 7 „	4	2	N.N.E.
3	7 m. „ 4 a.	8	6	S.W.	4 a. „ 7 „	4	3	N.E.
4	7 m. „ 5 a. *	6½	7	„	5 a. „ 7 „	3	3	„
5	7 m. „ 7 a.	4½	9	W.S.W.	7 a. „ 7 „	2	4	E.N.E.
6	7 m. „ 9 a.	2	11	W. by S.	9 a. „ 11 „	1	5	E. by N.
7	11 m. „ 7 a.	0½	12	W. by N.	7 a. „ 10 „	0	6	E. by S.
8	10 m. „ 9 a.	3	10	W.N.W.	9 a. „ 10 „	1	5	E.S.E.
9	10 m. „ 11 a.	5½	8	„	11 a. „ 10 „	2	4	„
10	10 m. „ midnight.	7½	7	N.W.	... ...	...	...	...
11	9 m. „ 2 fol. m. †	10	5	N.N.W.	0 m. to 9 m.	3	3	S.E.
12	9 m. „ 4 „	11½	4	„	2 m. „ 9 m.	5	2	S.S.E.
13	10 m. „ 5 „ *	12½	4	„	4 m. „ 10 m.	5	2	S.S.W.
14	10 m. „ 6 „	13	4	„	5 m. „ 10 m.	6	2	„
15	11 m. „ 7 „ †	12½	5	N.N.E.	6 m. „ 11 m.	6	2	„
16	Noon „ 7 „	11	6	„	7 m. „ noon.	6	2	„
17	3 a. „ 7 „ *	8½	9	N.E.	7 m. „ 3 a.	5	3	„
18	6 a. „ 7 „	5½	11	E.N.E.	7 m. „ 6 a.	4	5	S.W.
19	9 a. „ 7 „	1½	14	E. by N.	7 m. „ 9 a.	2	5	W.S.W.
20	8 a. „ 10 „	2½	12	E. by S.	7 m. „ 8 a.	0	7	W. by S.
21	10 a. „ 9 „	5½	10	E.S.E.	10 m. „ 10 a.	1	6	W. by N.
22	... ...	...	...	...	9 m. „ midnight	2	5	W.N.W.
23	0 m. to 9 m.	8	7	S.E.	9 m. „ 1 fol. m.	4	3	N.W.
24	1 m. „ 9 m. †	9½	5	S.S.E.	9 m. „ 2 „	4	2	N.N.W.
25	2 m. „ 9 m. *	10½	4	S.S.W.	9 m. „ 3 „	5	2	„
26	3 m. „ 10 m.	11	3	„	10 m. „ 4 „	5	1	„
27	4 m. „ 10 m. †	11	3	„	10 m. „ 4 „	5	1	„
28	4 m. „ 11 m.	10½	4	„	11 m. „ 4 „	5	2	„
29	4 m. „ noon	9½	4	„	Noon „ 5 „	4	2	N.N.E.
30	5 m. „ 1 a.	8½	6	S.W.	1 a. „ 5 „	4	3	N.E.
31	5 m. „ 3 a.	7	7	„	3 a. „ 5 „	3	3	„

Note.—General direction of Tendency due to Sun from N.N.W. to N.N.E., but as an expansive movement takes place during this month, the wind may probably be at first from S.E. to S.W. or from N.E. to S.E. becoming Nly. towards end of month. Daily change about 3 a.

* Retrograde movements begin. † Expansive movements begin.

(1.) Moon's maximum N. declination on the 6th = 25° 39′ decreased 14′
(2.) „ „ S. „ „ 19th = 25° 33′ „ 14′
(3.) „ „ N. „ „ Nov. 2nd = 25° 26′ „ 13′

(1.) Will probably be felt from the 4th to the 10th.
(2.) „ „ „ 17th „ 23rd.
(3.) „ „ „ 31st.

REMARKS.

1. Moon coming North from the 1st to the 6th.
   „ going South „ 7th „ 19th.
   „ coming North „ 20th to Nov. 2nd.
2. Change from the Westerly to the Easterly about the 15th.
   „ „ Easterly „ Westerly „ 25th.
   A minor change on the 2nd, 13th, or 29th.
3. The second great retrograde movement made by the Sun occurs about the end of this month, and as the Moon's retrograde movement takes place about the same time, viz., the 31st, a heavy storm not improbable about that date. It may be observed that the force from the north still continues the strongest, and the Moon's declination is diminishing rapidly. The rotatory velocity, however, is not quite so high as during the spring and summer months.

D. D.

BOOKS RECEIVED.

Dues and Charges on Shipping in Foreign Ports. Compiled by G. D. Urquhart. Fourth Edition, revised and augmented by John Green. London and Liverpool: G. Philip and Son. 1879.

The value of this manual of reference has been for a long time fully recognised in shipping circles, containing as it does information of the greatest service to mariners visiting foreign ports. The details given appear to be obtained from authentic sources, and in addition to stating the dues and charges to which vessels visiting the various ports are liable, many useful particulars are published concerning port and harbour regulations, the local customs in regard to the transaction of business, the various signals employed at different places, the exports and imports, the local practices in all that relates to nautical matters, &c. This general summary shows that the scope of the work is extremely serviceable, and as regards its accuracy, the test of time and experience is greatly in its favour, it having now reached the fourth edition. We observe

that there are about one hundred and thirty pages in the present volume more than in the last edition, and the information is brought up to the latest date. Every port of importance, and many of little or no importance, are included, and the whole work is remarkably complete and comprehensive considering the difficulty attendant on procuring trustworthy information from remote and seldom frequented places.

The Sailor's Sea-Book: A Rudimentary Treatise on Navigation. By James Greenwood, B.A. New, thoroughly revised and much enlarged edition. By W. H. Rosser. London: Crosby, Lockwood & Co., Stationers' Hall Court. 1879.

PROBABLY very many of our readers are acquainted with the original edition of this little work, but in its new form we doubt much if they would recognise it. The navigation portion is a concise epitome of useful information, not meant to supply any deficiency in existing works, but merely intended to give sufficient information in a plain and practical manner so as to enable any intelligent person to appreciate and practice the art of navigation. This object appears to us to be attained, and though altered and added to in this new edition, the treatise remains a valuable expounder of what would-be navigators ought to know. The new matter relates to the use of the International Code of Signals, the Rule of the Road at Sea, Life-Saving Apparatus, Law of Storms, and a Dictionary of Sea Terms. These additions make the work much more useful, and as the several subjects are treated in a simple, practical manner, they are readily intelligible, and may be easily mastered by students who possess ordinary intelligence and who desire to learn.

This work can also be obtained under the title of "Practical Navigation," bound up with a rudimentary treatise on logarithms and a valuable series of mathematical and nautical tables, which greatly enhance the utility of the volume.

TIDE TABLES FOR OCTOBER, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
W	1	2 10	2 32	6 43	6 59	3 35	3 51	2 33	2 48	5 55	6 11	11 25	11 42
Th	2	2 47	3 2	7 15	7 31	4 7	4 23	3 3	3 18	6 27	6 41	11 59	—
F	3	3 17	3 33	7 47	8 2	4 39	4 55	3 34	3 50	6 54	7 7	0 16	0 33
S	4	3 49	4 3	8 17	8 32	5 11	5 27	4 6	4 22	7 20	7 33	0 49	1 6
S	5	4 18	4 34	8 48	9 5	5 43	6 0	4 38	4 54	7 46	8 1	1 23	1 40
M	6	4 50	5 7	9 23	9 42	6 18	6 37	5 13	5 33	8 16	8 31	1 58	2 17
Tu	7	5 25	5 44	10 2	10 26	7 0	7 25	5 56	6 20	8 48	9 8	2 37	2 58
W	8	6 7	6 34	10 56	11 31	7 58	8 27	6 49	7 22	9 33	10 3	3 21	3 48
Th	9	7 4	7 39	—	0 10	9 7	9 49	8 0	8 42	10 38	11 18	4 19	4 55
F	10	8 21	9 5	0 50	1 32	10 35	11 14	9 28	10 8	—	0 4	5 35	6 14
S	11	9 52	10 32	2 9	2 45	11 52	—	10 45	11 18	0 51	1 34	6 52	7 29
S	12	11 6	11 35	3 19	3 49	0 25	0 51	11 46	—	2 12	2 45	7 59	8 25
M	13	—	noon	4 18	4 34	1 14	1 34	0 8	0 27	3 15	3 41	8 48	9 11
Tu	14	0 23	0 44	4 54	5 14	1 54	2 13	0 48	1 9	4 6	4 28	9 33	9 54
W	15	1 5	1 25	5 35	5 56	2 32	2 51	1 29	1 49	4 50	5 12	10 16	10 38
Th	16	1 46	2 6	6 17	6 38	3 10	3 30	2 9	2 29	5 34	5 56	11 2	11 26
F	17	2 26	2 47	6 59	7 21	3 51	4 14	2 49	3 9	6 18	6 39	11 50	—
S	18	3 8	3 31	7 43	8 6	4 37	5 0	3 31	3 54	6 59	7 20	0 14	0 39
S	19	3 52	4 15	8 30	8 54	5 24	5 40	4 18	4 43	7 42	8 4	1 4	1 29
M	20	4 40	5 4	9 19	9 45	6 14	6 41	5 9	5 36	8 26	8 49	1 54	2 20
Tu	21	5 29	5 57	10 18	10 4[illegible]	7 10	7 4[illegible]	6 6	6 38	9 14	9 40	2 47	3 14
W	22	6 26	6 58	11 22	—	8 19	9 0	7 14	7 54	10 11	10 47	3 44	4 15
Th	23	7 35	8 15	0 4	0 44	9 45	10 26	8 37	9 21	11 27	—	4 49	5 26
F	24	8 58	9 45	1 23	2 1	11 6	11 42	10 0	10 35	0 9	0 51	6 8	6 41
S	25	10 20	10 55	2 35	3 [illegible]	—	0 17	11 8	11 36	1 31	2 7	7 18	7 49
S	26	11 20	11 56	3 38	4 8	0 41	1 5	11 59	—	2 37	3 3	8 15	8 38
M	27	—	0 17	4 26	4 46	1 26	1 45	0 19	0 39	3 27	3 49	9 0	9 21
Tu	28	0 37	0 56	5 4	5 22	2 8	2 21	0 58	1 17	4 11	4 31	9 41	10 0
W	29	1 15	[illegible]	5 40	[illegible]	2 37	[illegible]	1 34	1 51	4 49	5 7	10 19	10 37
Th	30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5 23	[illegible]	10 55	11 1[illegible]
F	31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5 56	6 11	11 31	11 4[illegible]

Week Day.	Month Day.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	London Derry. A.M.	London Derry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
W	1	7 6	7 22	11 31	11 47	0 3	0 20	5 12	5 29	11 19	11 35	8 11	8 26	3 56	4 12
Th	2	7 38	7 53	—	0 3	0 36	0 52	5 45	6 1	11 51	—	8 40	8 54	4 28	4 43
F	3	8 7	8 21	0 19	0 34	1 8	1 24	6 16	6 31	0 7	0 23	9 8	9 22	4 58	5 12
S	4	8 35	8 50	0 49	1 4	1 39	1 54	6 46	7 2	0 39	0 55	9 36	9 51	5 26	5 42
S	5	9 5	9 20	1 19	1 35	2 9	2 25	7 18	7 35	1 12	1 29	10 8	10 26	5 59	6 17
M	6	9 35	9 51	1 52	2 10	2 42	2 59	7 52	8 10	1 47	2 7	10 48	11 14	6 35	6 56
Tu	7	10 8	10 27	2 30	2 52	3 19	3 41	8 30	8 52	2 29	2 52	11 44	—	7 19	7 44
W	8	10 53	11 27	3 17	3 47	4 5	4 33	9 19	9 51	3 19	3 52	0 18	0 58	8 12	8 46
Th	9	—	0 5	4 24	5 6	5 7	5 45	10 29	11 13	4 30	5 10	1 42	2 26	9 25	10 10
F	10	0 48	1 30	5 55	6 30	6 28	7 10	11 56	—	5 58	6 30	3 10	3 46	10 55	11 37
S	11	2 11	2 50	7 19	7 55	7 49	8 25	0 35	1 13	7 6	7 39	4 19	4 47	—	0 14
S	12	3 24	3 56	8 23	8 47	8 56	9 23	1 46	2 14	8 9	8 35	5 9	5 29	0 44	1 10
M	13	4 23	4 49	9 8	9 28	9 46	10 8	2 38	3 2	8 59	9 22	5 49	6 9	1 32	1 53
Tu	14	5 13	5 36	9 48	10 8	10 30	10 52	3 23	3 44	9 42	10 0	6 29	6 49	2 13	2 33
W	15	5 59	6 22	10 28	10 49	11 14	11 36	4 6	4 28	10 18	10 38	7 10	7 31	2 53	3 13
Th	16	6 41	7 6	11 10	11 31	11 58	—	4 50	5 12	10 58	11 19	7 51	8 11	3 34	3 56
F	17	7 28	7 50	11 53	—	0 20	0 42	5 35	5 58	11 42	—	8 31	8 52	4 18	4 40
S	18	8 12	8 34	0 16	0 39	1 5	1 28	6 21	6 44	0 5	0 29	9 13	9 34	5 2	5 25
S	19	8 56	9 18	1 2	1 25	1 51	2 15	7 8	7 32	0 53	1 18	9 57	10 22	5 49	6 13
M	20	9 40	10 2	1 49	2 14	2 39	3 4	7 56	8 21	1 43	2 11	10 50	11 25	6 39	7 6
Tu	21	10 24	10 50	2 40	3 8	3 30	3 57	8 47	9 14	2 39	3 10	—	0 4	7 35	8 6
W	22	11 22	mid.	3 40	4 18	4 27	5 2	9 46	10 25	3 45	4 24	0 47	1 35	8 41	9 21
Th	23	—	0 40	5 1	5 46	5 40	6 21	11 0	11 48	5 4	5 44	2 22	3 [illegible]	10 4	10 48
F	24	1 22	2 2	6 32	7 11	7 2	7 40	—	0 26	6 21	6 56	3 39	4 11	11 28	—
S	25	2 39	3 18	7 44	8 13	8 16	8 46	1 3	1 36	7 29	7 59	4 38	5 0	0 4	0 34
S	26	3 44	4 11	8 37	8 59	9 13	9 36	2 4	2 28	8 25	8 48	5 21	5 40	1 0	1 23
M	27	4 37	5 1	9 19	9 38	9 58	10 18	2 51	3 12	9 11	9 32	5 59	6 18	1 43	2 3
Tu	28	5 22	5 42	9 55	10 12	10 38	10 57	3 32	3 51	9 50	10 6	6 37	6 55	2 21	2 38
W	29	6 1	6 20	10 30	10 46	11 16	11 34	4 9	4 28	10 22	10 38	7 13	7 31	2 55	3 12
Th	30	6 37	[illegible]	11 3	11 1[illegible]	11 51	—	4 46	5 0	10 53	11 8	7 46	8 1	3 29	3 46
F	31	7 1[illegible]	[illegible]	11 3[illegible]	[illegible]	0 [illegible]	0 [illegible]	5 17	5 3[illegible]	11 24	11 41	8 10	8 [illegible]	4 3	4 18

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub*.), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 8	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 8	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 18	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

CORRESPONDENCE.

THE "PRINCESS ALICE" AND THE "BYWELL CASTLE."

To the Editor of the "Nautical Magazine."

SIR,—Captain Colomb has written many letters on this subject to the daily papers. For obvious reasons I have refrained from noticing them so long as the matter was before the Courts. As some of his assumptions of fact have been erroneous, and as I venture to think that his conclusions are not altogether sound, perhaps you will allow me now to say a few words in reply.

In his earlier letters, and especially in a highly sensational one which appeared in the *Times* in November last, shortly after the conclusion of the Board of Trade Inquiry, he assumed that the *Princess Alice* never was on the port bow of the *Bywell Castle*, and he said "I do not gather that there is any good evidence to show that the *Princess Alice* ever saw both lights" (meaning both side lights) "of the *Bywell Castle* at the same time," and he concludes his letter by saying "the *Bywell Castle* had a distinct signal to put her helm hard-a-starboard and she put it hard-a-port."

Now if there was one piece of evidence more clear than another, or supplied from a more unquestionably unbiassed source, it was that of Webb, a naval pensioner, and a passenger on board the *Princess Alice*, and he proved to the entire satisfaction of the Court that the *Bywell Castle's* three lights were clearly seen from the *Princess Alice*, and that they continued in sight together for an appreciable time, and it was also proved that the *Princess Alice* was at one time on the port bow of the *Bywell Castle*. This has since been also proved to the satisfaction of three other tribunals, viz., the Coroner, the Court of Admiralty, and the Court of Appeal.

In his letter to you in your last number, Captain Colomb says: "She (the *Bywell Castle*) ported to *all three lights*," and he adds that "the Admiralty Court and Court of Appeal have both declared distinctly that this was a wrong movement." I think Captain Colomb is not quite correct here. What the Court of Appeal *declared distinctly* was, that *assuming* the movement of the *Bywell*

Castle to have been wrong, the wrong movement of the *Princess Alice* was made when the vessels were close together, that the imminence of the danger relieved the *Bywell Castle* from the consequences of contributory negligence. The counsel for the *Bywell Castle*, whilst arguing on this issue, was careful to state that he did not admit that her movement was wrong, and Lord Justice Brett, in his judgment, said: "It is immaterial whether the order to hard-a-port was given or not." The Admiralty Court, not only did not take into consideration the question of imminence, but its decision appears to have been based on the assumption that the *Bywell Castle* ported to a green light *only*, or Sir Robert Phillimore would scarcely (after deciding that the red light of the *Princess Alice had* been on the port bow of the *Bywell Castle*, and that the green light was shown to her on her port bow) have expressed himself as follows: "Having seen the green light of the *Princess Alice* she (the *Bywell Castle*) hard-a-ported *into it*. There is no doubt that this was a wrong manœuvre."

As I cannot conceive Captain Colomb to persist in disputing the unanimous decision, *on a question of fact*, of all the Courts which have tried this case, I understand his contention now to be, that if I see a-head, or a little on my port bow, a red and masthead lights change to all three lights, I am to assume that the vessel carrying those lights is turning round and about to cross my bows; but I ask, why am I not to assume, when I see all three lights, that the vessel is steadying and shaping a course to pass me port-side to port-side? On the part of the *Bywell Castle* this assumption would have been the more especially reasonable, since at the time when the *Princess Alice* first showed all her three lights she had got her head straight up the reach, and might have been reasonably presumed to be going in that direction. When I have to judge what the action of another is likely to be, I assume that it will be reasonable and right, and until I have some evidence (such as the shutting in of the red light of the *Princess Alice*) I have no right to conjecture that he will do a wrong action, and the more so, if it be one (like the case in point) fraught with imminent danger to himself.

Now, Sir, as to the final manœuvre of the *Bywell Castle* being

right or wrong. This appears to me wholly to depend on whether the order to reverse the engines was given or not. The evidence of those on deck clearly stated that it was, whilst the engineers stated the contrary. At any rate, granting that the order was not given by the telegraph, more than one witness swore that he heard that order given by word of mouth. I am not concerned with what was passing through the mind of the pilot of the *Bywell Castle*, or the reasons he may give for his action on such a sudden emergency, but I do hold, that, had he had an hour instead of a second, in which to make his decision, he could not have given an order more calculated to avoid a collision such as this was, than "hard-a-port, stop, and reverse," in the same breath. The effect of which order, had there been time for it to have been executed, would have been to cant the ship's head to port, and that the more rapidly with a tide driving under her stern.

I am, Sir, your obedient servant,

WM. PARFITT.

Blackheath, 12th September, 1879.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C., and* 6, *Lord Street, Liverpool.*

ENGLISH (APPLICATIONS).

3293. Charles Jones, Liverpool. "Improvements in and connected with propellers, engines and boilers, for steam ships."

3311. James Newall and George William Newall, both of Canning Town, Essex. "Improvements in screw-propellers."

3353. John Lumsden Morice, Liverpool. "Improvements in ships' berths."

3354. Charles Tellier, Paris. "Improvements in or applicable to ships or vessels."

3363. Adolphus Vogt, Pimlico, London. "The construction of a floating syphon dock."

3399. Isaac Blake, Aston, Birmingham. "Improvements in ships' lamps, which improvements may be applied wholly or in part to other lamps."

3438. John William D. Caux, Great Yarmouth, Norfolk. "Improvements in apparatus employed in deep-sea fishing or trawling."

3450. James Casey, Philpot Lane, London. "An improved automatic valve to be applied to boats in lieu of the plug or cork now in use, and in order to secure the safety of human life."

3472. Alexander Wilson, Paddington, Middlesex. "Improved compounds or combination of ingredients for insulating and coating telegraph wires (submarine and land)."

3487. Thomas Ferdinand Walker, Birmingham. "Improvements in apparatus for use in effecting deep-sea soundings."

3566. Marshall McDonald, Lerington, U.S.A. "Improvements in fishways, applicable also for the passage of boats." (A communication.)

3589. Francis Service, Llandaff. "Improved arrangement of mechanism for loading or unloading fuel, or other materials or substances in cubical or other blocks, from or to any ship, boat, truck, or other position or place."

3595. John Horner Fitzgerald, St. Andrews, Fife. "A new or improved construction of net-hauling machine."

3603. Theodor Otto Ludwig Schrader, New York City, U.S.A. "An improved ship's berth of simple construction, that maintains a horizontal position during the rolling or pitching motion of the vessel, so as to render sea voyages less annoying, and increases the comfort of the passengers materially." (A communication.)

3623. Daniel Henry Sisson, Goole, Yorks. "Improvements in the means or apparatus employed for propelling ships or vessels, such improvements being applicable as an auxiliary means for imparting motion to the same."

3629. Alexander Gordon, New York City, U.S.A. "Improvements in ship's logs." (A communication.)

3650. William Ward, South Shields. "An improved composition for coating ships' bottoms and for other purposes." (Complete specification.)

3657. George C. L. Lenox, Lime Street, London. "Improvements in buoys, and in apparatus for mooring the same."

3690. George S. F. Edwards. "Improvements in compositions for protecting or preserving ships' bottoms and other submerged surfaces, also applicable to stone and other building materials."

AMERICAN.

215031. Henry Webb, Rockport. "Fish Traps."

215057. Henry H. Ham, Jun., Portsmouth, N.H. "Ships' bells indicating clocks."

215136. Daniel Knowles, Norfolk, Va. "Marine vessels for preventing the shifting of cargoes."

215148. Karl Moller, Kupferhammer, Germany. "Floating weirs or caissons."

215403. Henry A. Severn, Earl's Court Square, Middlesex. "Mariners' compasses."

215842. Richard H. Tucker, Wiscasset, Me. "Pneumatic propulsion of vessels."

215843. Richard H. Tucker, Wiscasset, Me. "Surf boats."

215855. Benjamin Allee, East Boston, Mass. "Cattle stalls for vessels."

215994. Richard H. Tucker, Wiscasset, Me. "Ships' hulls."

216136. Julius Von Binzer and Edward Bentzen, Salzburg, Austria. "Screw-propellers."

216175. Dixon Gough, Carrollton, Ma. "Propelling devices for vessels."

216208. William T. Merritt, Pough Keepsie. "Feathering paddle-wheels."

216244. John B. Ward, San Francisco, Cal. "Screw-propellers."

216424. Cesare Liparelli. New York. "Ballast logs for vessels."

216470. Andy E. Tangen, Bismark. "Propelling apparatus for vessels."

216682. Thomas W. Furly, Grand Haven, Mich. "Treenails for ships, &c."

216802. Henry T. Morse, Athol, Mass. "Construction of hulls of vessels."

216804. Francis L. Horton, New York. "Ventilating buildings, vessels, &c."

216880. Horatio Nelson, New York. "Enamelled screw-propellers."

216919. John F. Watson, Philadelphia. "Mariners' compasses."

217011. Henry F. Knapp, New York. "Marine torpedoes."

217014. Stephen Longfellow, St. Louis. "Mariners' compasses."

217120. John L. Lay, Buffalo. "Valve for torpedo boats."

BELGIAN.

49035. C. Delnest, Mons. "A screw-propeller for steamers."

49063. H. Durant and B. Lebrun, Nimy, Mons. "Propelling canal boats."

FRENCH.

129482. Blanchod. "A propeller for steamers."

GERMAN.

6912. J. Ziegler, Treuchtlingen. "A horizontal water wheel."

6922. F. Olguin, London. "An extincteur for large vessels."

6929. A. Gareis, Pola. "A sea compass."

6954. J. H. MacLean, and M. Coloney, St. Louis (U.S.) "Modifications in torpedoes and other explosive bodies fired by clockwork."

7027. C. P. Gadewoltz, Ottensen. "Improvements in ships' lanterns."

7169. F. Steinboehmer, Iserlohn. "An elastic ring for ship and other lamps."

7170. J. L. Lay, Paris. "Improvements in torpedo boats."

7283. F. Gosebrink, Werther. "A self-regulating syphon feeder for high breast water wheels."

7302. G. de la Maronière, Nantes. "Improvements in paddle-wheels."

VICTORIAN.

2653. Robert Wilcox, Faukner Street, St. Hilda, Melbourne. "Improvements in steam vessels."

CONSTRUCTING BREAKWATERS, &c.

4919/78. Josiah Latimer Clark and John J. Stanfield, Westminster Chambers, Westminster, Civil Engineers. In constructing breakwaters, groins, or piers, a shield of iron is used

shaped internally so as to mould the breakwater or pier to the desired shape. It consists of two skins, the interior skin forms the mould for the pier and is intended to be filled with concrete, and the exterior skin is of great strength so as to resist the impact of the waves. The two skins are united by internal decks and bulkheads, and by iron stays; the interior space is divided into watertight compartments, and provided with pumping machinery. As soon as the interior space within the shield has been sufficiently filled with concrete and become hardened, the shield is partially emptied of water until it nearly floats, and is then thrust forward a certain distance and again allowed to sink and filled with concrete; and in this manner it is moved forward by degrees until the whole length of the wall is completed.

STEAM CAPSTANS.

176/79. James Vivian, Mylor Bridge, Cornwall. This consists of a circular frame, the upper part of which is provided with a circular inside flange, on which is fitted a cover freely revolving round a centre shaft, and carrying with it two guide pulleys. A slide bolted to the underside of the cover and provided with teeth, enables the cover, by means of a pinion, to be turned round to any desired point. On a vertical arm, attached to the cover on the opposite side of the centre shaft to that of the guide pulleys, is fitted a drum, rotated by a pinion on the centre shaft. A three-cylinder engine is attached to the side of the frame actuating a shaft, a bevel wheel at the end of which gears into a similar bevel wheel, on the vertical shaft actuating the cover.

LUMINOUS ELECTRIC BUOYS.

465/79. Stanislas Wm. Meldon, de Sussex, Bruxelles, Belgium, Civil Engineer. A buoy is constructed of an open frame of cross-bars, enclosing an annular float of sheet iron to give the structure the requisite power of flotation. The battery, consisting of plates of carbon and zinc, is placed in the centre of the buoy and so arranged that the sea-water, constituting the excitant, flows continually through the battery trough. Electrically connected with the battery is a Ruhmkorff's induction coil and a Giesler's vacuum tube. The latter, consisting of a long tube rolled into a ball so as

to form a luminous centre, is placed in a lantern of strong uranium glass at the top of the buoy. A clockwork movement is added when an intermittent light is desired.

SHIPS' LAMPS.

496/79. Albert Marcius Silber, Wood Street, London. In consequence of the external glass of lamps employed in exposed situations often fracturing from the unequal expansion of the glass, and the metallic framing in which it is secured, it is impossible to obtain the amount of light desirable, the flame being restricted in order to avoid excessive heating of the glass or its framing. The object of this invention is to avoid the danger of fracture of the glasses, thereby permitting the use of larger and more luminous flames than can be now safely employed. This is effected by fixing the external glass in a separate framing, and securing the framing by pins and loops to the body of the lantern, and fixing within the lantern another glass, half cylindrical in form, as as to enclose the frame air-tight between it and the back of the lantern. This effectually prevents any spray entering into the lamp proper, and the inner glass being of uniform thickness and well annealed, it is not liable to suffer from undue expansion and contraction.

EXTINGUISHING FIRES ON BOARD SHIP.

1446/79. Alfred Julius Boult, of the firm of William P. Thompson & Co., 323, High Holborn, London, W.C. (A communication to him in trust by G. L. Garfield, Albany, New York, U.S.A.) In extinguishing fires on board ship or in buildings, stores &c., the want of a rapid, effectual, clean, and non-destructive mode has long been felt. Innumerable instances could be cited to show that greater damage has resulted by the exclusive use of water as a fire extinguisher than from the effects of the fire itself, both from overflooding and from the scarcity of water in the winter season, or from other causes. The object of this invention is to provide for the above-named want, and is accomplished by forcing the nitrogen contained in the atmosphere into the midst of the fire at a low temperature, in such volumes as to neutralize the effects of the oxygen upon which alone the fire can exist.

shaped internally so as to mould the breakwater or pier to the desired shape. It consists of two skins, the interior skin forms the mould for the pier and is intended to be filled with concrete, and the exterior skin is of great strength so as to resist the impact of the waves. The two skins are united by internal decks and bulkheads, and by iron stays; the interior space is divided into watertight compartments, and provided with pumping machinery. As soon as the interior space within the shield has been sufficiently filled with concrete and become hardened, the shield is partially emptied of water until it nearly floats, and is then thrust forward a certain distance and again allowed to sink and filled with concrete; and in this manner it is moved forward by degrees until the whole length of the wall is completed.

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MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
272	England—Scilly Islands—Seven Stones	Proposed alterations made.
273	" East Coast—Thames River Entrance	Buoys lighted by gas, experimentally.
274	" " Yarmouth District	Alteration of buoyage, &c.
275	" " Inner Dowsing Overfalls	New buoys.
276	Scotland—East Coast—Burntisland Harbour	New lights on E. and W. piers.
277	" West Coast—Clyde River	New lights.
278	England—St. George's Channel—Bahama Bank	Alteration of light and new fog-signal.
279	" Bristol Channel—King Road	Newcome buoy altered in position.
280	North Sea—Netherlands—Hook of Holland Canal	Tidal signals.
281	" " Egmond-aan-Zee	Temporarily discontinued.
282	Baltic Entrance—Kattegat—Warberg	Alteration in colour of lighthouse.
283	" Sound — Kronborg Castle	Alteration in fog-signal.
284	" Copenhagen — Tre Kroner Battery	Alteration in fog-signal.
285	" Kiel Bay — Femern Island	New fog-signal at Marien lighthouse.
286	Baltic—Sweden—Karlskrona	New light at Godnatt.
287	Norway—West Coast—Lepsörev	Alteration of light; and light-vessel removed.
288	Adriatic—Sinigaglia	Erratum; and change in light.
289	" Port Pola Entrance	Submarine mines.
290	Eastern Archipelago—Sumatra—Pulo Nias	Sunken rock to westward.
291	China Sea—Tambelan Islands—Camels Hump	Bank to south-eastward.
292	" Carimata Strait—Montarin Islands—Napier Island	Sunken danger to north-west.
293	Australia—East Coast—Trinity Bay	Sunken danger reported.
294	" Torres Strait — Prince of Wales Channel	Reported rock.
295	New Zealand—North Island—Tararu Point	Light discontinued.
296	" " Patea River Entrance	New light.
297	" Middle Island—Oamaru	Danger signals.
298	North America—British Columbia—Chatham Sound	Sunken danger in Brown Passage.
299	West Indies—British Guiana—Demerara	Position of light-vessel altered.
300	" British Guiana — George Town	Light in the fort.
301	" Curaçao Island — Little Curaçao Island	New light.
302	" Martinique Island—Caravelle	Range of visibility less distant.
303	" British Honduras—Belize Harbour	Range of visibility of various lights, and alterations.
304	United States—Massachusetts—Chatham	Automatic signal buoy.
305	" Gulf of Maine	Discovery of sunken ledge.

NAUTICAL NOTICES.

272.—England.—*Scilly Islands.—Alteration in the Character of the Light at the Seven Stones.*—With reference to Notice 148, p. 540, the two fixed lights at the Seven Stones have been discontinued, and in lieu thereof there is now exhibited, 36 feet above the level of the sea, one white revolving light, showing three flashes in quick succession, followed by an interval of 36 seconds of darkness, the whole revolution occupying one minute. Also, the fog-signal has been greatly strengthened, and is now a powerful siren-trumpet, which will be sounded during thick and foggy weather, giving three blasts in quick succession every two minutes.

273. — England. — *East Coast. — Thames River Entrance. — Experimental Buoys Lighted by Gas.* — The Trinity House has placed, experimentally, two buoys lighted by gas, at the entrance to the river Thames; one near the Mouse light-vessel and the other near Sheerness Middle buoy.

274.—England.—*East Coast.—Alteration of the Buoyage in the Yarmouth District.*—During the month of September, 1879, the following alterations and additions would be made in the buoyage of the Yarmouth district, viz.:—

1. *Covehithe Channel.*—The Covehithe buoy moved 2 cables to the S.S.W.; the S.W. Barnard buoy moved 1 cable to the south-west.

2. *Stanford Channel.*—The East Newcome buoy moved 7 cables N.E. ¼ N.; the South Holm buoy moved 8½ cables N.E. ¼ N.; the South-west Holm buoy moved 9 cables N.E. ¼ N.; the North-east Newcome buoy moved 1 cable to the southward; the East Middle Newcome buoy to be discontinued.

3. *Holm Sand.*—The East Holm buoy moved 1 cable to the northward; the North Holm buoy moved 1¼ cable S.S.W.

4. *Haisboro' Sand.*—The Middle Haisboro' buoy moved ¾ of a mile S.S.E. Also, a new *Cylinder* buoy (*black* and *white*

MONTHLY ABSTRACT OF NAUTICAL NOTIC

No.	Place.	Subject.
272	ENGLAND—Scilly Islands—Seven Stones	Proposed alterations
273	" East Coast—Thames River Entrance	Buoys lighted by gas,
274	" " Yarmouth District	Alteration of buoyage,
275	" " Inner Dowsing Overfalls	New buoys.
276	SCOTLAND—East Coast—Burntisland Harbour	New lights on E. and W.
277	" West Coast—Clyde River	New lights.
278	ENGLAND — St. George's Channel — Bahama Bank	Alteration of light signal.
279	" Bristol Channel—King Road	Newcome buoy altered
280	NORTH SEA—Netherlands—Hook of Holland Canal	Tidal signals.
281	" " Egmond-aan-Zee	Temporarily discontin
282	BALTIC ENTRANCE—Kattegat—Warberg	Alteration in colour
283	" Sound — Kronborg Castle	Alteration in fog-signal
284	" Copenhagen — Tre Kroner Battery	Alteration in fog-sig
285	" Kiel Bay —Femern Island	New fog-signal at
286	BALTIC—Sweden—Karlskrona	New light at
287	NORWAY—West Coast—Lepsörev	Alteration of light removed.
288	ADRIATIC—Sinigaglia	Erratum; and
289	" Port Pola Entrance	Submarine
290	EASTERN ARCHIPELAGO—Sumatra—Pulo Nias	Sunken rock
291	CHINA SEA—Tambelan Islands—Camels Hump	Bank to south
292	" Carimata Strait—Montarin Islands—Napier Island	Sunken
293	AUSTRALIA—East Coa[illegible]	Sunken
294	" Torr[illegible]	Reported
295	NEW ZEALAND[illegible]	Light
296	" [illegible]	New
297	" [illegible]	[illegible]
298	NORTH A[illegible]	[illegible]
299	WEST IN[illegible]	[illegible]
300	" [illegible]	[illegible]
301	" [illegible]	[illegible]
302	[illegible]	[illegible]
303	[illegible]	[illegible]
304	UNI[illegible]	[illegible]
305	[illegible]	[illegible]

rd **the light-vessel,**
ather, **giving** ***two***

Road.— Newcome
es **from its former**
ater **spring tides,**
The western land
Blaize castle just
hotel, E. by S. ¾ S.
Signals indicating
The tidal signals
trance, will in future
outside the northern

ry Discontinuance of
on in the illuminating
scontinued from 10th

lteration in Colour
painted red with two

nore.—Alteration in Fog-
discontinued, and during
ll be sounded, giving *one*
ry minute.

gen.—Alteration in Fog-
gong is discontinued and a
the battery, will be sounded
ving *one* blast of nearly *eight*
seconds.

el Bay.—Fog-Signal near Marien
been established near Marien light-
of Femern island. It is a siren,
foggy weather, will give *two* blasts
on each, separated by an interval of
ed by an interval of from *sixty to seventy*

vertical stripes), named North Middle Haisboro', to be placed $2\frac{1}{2}$ miles S. $\frac{1}{4}$ W. of the North Haisboro' buoy.

5. *Foulness Rocks.*—A 9-foot *conical* buoy to be substituted for the can buoy at Foulness rocks, and moved $\frac{1}{2}$ a mile N.N.W.

These alterations and additions have been effected. The marks and bearings will be given next month.

275.—England.—*East Coast.—Inner Dowsing Shoal.—New Buoys.*—With a view to the better marking of the Inner Dowsing Shoal, a 9-feet *conical buoy*, painted in black and white vertical stripes, surmounted by a *staff* and *cage*, and named "Overfalls," has been placed on the North West side of the "Inner Dowsing Overfalls," and lies in 7 fathoms at low water spring tides, with the following compass bearings, viz.:—Inner Dowsing light-vessel, E. by S. (distant $2\frac{1}{2}$ miles); North Inner Dowsing buoy, S.E. by E. (distant 2 miles); and an 8-feet *can buoy*, painted in *black* and *white* horizontal bands, has been placed in the position formerly occupied by the "North Inner Dowsing" conical buoy.

276.—Scotland.—*East Coast.—Lights at Burntisland Harbour.*—A *red* light on the East pier head, with a *white* light in the lower part of the Tower, and a *green* light on the West pier head, are now shown at the entrance of Burntisland harbour.

277.—Scotland.—*West Coast.—Clyde River.*—A floating swimming bath is now moored in Gourock bay, within the line of its outer points; from the outer extremity of this bath, a fixed white light is exhibited. Also, a light-vessel has been moored in 12 feet water, $3\frac{1}{3}$ cables N.E. by E. from Garvel house, Greenock: from the light-vessel is exhibited an occulting *white* light, in periods of *eight seconds*, showing a light of *four seconds'* duration, followed by two short eclipses in the next *four seconds*.

Note.—The temporary red light, formerly shown from a barge moored off Garvel point, is discontinued.

278.—England.—*St. George's Channel.—Alteration in the Character of the Bahama Bank Light, and New Fog-Signal.*—The two fixed lights in the Bahama Bank light-vessel have been discontinued, and *one white revolving* light, in lieu thereof, is now exhibited, showing *two flashes in quick succession every half-minute*, at an elevation of 38 feet above the level of the sea. Also a siren

trumpet *fog-signal* has been established on board the light-vessel, which will be sounded during thick and foggy weather, giving *two blasts in quick succession every two minutes.*

279.—ENGLAND.—*Bristol Channel.—King Road.—Newcome Buoy.*—This buoy has been moved North 2 cables from its former position, and now lies in $3\frac{1}{4}$ fathoms at low water spring tides, with the following marks and bearings, viz.:—The western land just opening of Blackmore point, W.S.W.; Blaize castle just touching the west side of the old Avonmouth hotel, E. by S. $\frac{3}{4}$ S.

280.—NORTH SEA.—*Netherlands.—Tidal Signals indicating depth on Bar of Hook of Holland Canal.*—The tidal signals established at Hook of Holland canal, *North entrance*, will in future indicate the least depth of water on the bar outside the northern mole head, in direction of leading lights.

281.—NORTH SEA.—*Netherlands.—Temporary Discontinuance of Egmond-aan-zee Lights.*—Pending an alteration in the illuminating apparatus, the lights will be temporarily discontinued from 10th August, 1879.

282.—BALTIC ENTRANCE.—*Kattegat.—Alteration in Colour of Warberg Lighthouse.*—Henceforth to be painted red with two white bands.

283.—BALTIC ENTRANCE.—*Sound.—Elsinore.—Alteration in Fog-Signal at Kronborg Castle.*—The gong is discontinued, and during thick and foggy weather a fog-horn will be sounded, giving *one* blast of nearly *eight seconds'* duration *every minute.*

284.—BALTIC ENTRANCE.—*Copenhagen.—Alteration in Fog-Signal at Tre Kroner Battery.*—The gong is discontinued and a fog-horn, on the north-east corner of the battery, will be sounded during thick and foggy weather, giving *one* blast of nearly *eight seconds'* duration every *thirty-five seconds.*

285.—BALTIC ENTRANCE.—*Kiel Bay.—Fog-Signal near Marien Lighthouse.*—A fog-signal has been established near Marien lighthouse, north-east extreme of Femern island. It is a siren, which, during thick and foggy weather, will give *two* blasts of *three seconds'* duration each, separated by an interval of *six seconds*, and followed by an interval of from *sixty to seventy seconds.*

286.—Baltic.—*Sweden.—Karlskrona.*—The new light at Godnatt was exhibited on 1st September, and the lights from the light-vessel and the east point of the arsenal extinguished. Particulars of the various sectors not yet to hand.

287.—Norway.—*West Coast.—Alteration in Lepsörev Light.*—Exhibited from a lighthouse, painted white, erected on the head of the mole which extends from Gamlemshaug, south side of the channel lying south of Lepsö. It is a *fixed* light showing *white* between the bearings of N. 68° E., through east and south to S. 39° W., *red* between the bearings of S. 39° W. and S. 59° W., and *white* between S. 59° W. and S. 68° W.; elevation 28 feet above the sea, and visible 9 miles. To be exhibited from 1st August to 15th May. Position as given, lat. 62° 35′ 15″ N., long. 6° 15′ 30″ E.

Note.—The light-vessel, heretofore placed on the south-east part of the reef extending south from Lepsö, has been withdrawn. *Variation,* 18° *W.*

288.—Adriatic.—*Sinigaglia.—Erratum and Change in Light.*—With reference to Notice 228, August number, p. 714, on the exhibition of a fixed *green* light at the outer end of the works extending from the east mole, Sinigaglia, further notice has been given that it is a *fixed white* light. *Also,* that when the river Misa is so swollen as to prevent the entry of vessels, a *green* light will be substituted for this *white* light.

289.—Adriatic.—*Port Pola.—Submarine Mines at Entrance.*—Submarine mines have been laid down on the northern side of the entrance to port Pola, near Zonchi battery and Grossa point. The outer extremity of these mines will be marked by a guard boat, which during the day would be distinguished by a red pendant, and at night by a *fixed* white light, on the flag staff. A *flashing* light will also be exhibited from the guard boat when vessels are entering or leaving port Pola at night.

Caution.—Vessels when entering or leaving port Pola must pass southward of this guard boat.

290.—Eastern Archipelago.—*Sumatra.—West Coast.—Sunken Rock Westward of Pulo Nias.*—This danger (*Aztec rock*) on which the British barque *Aztec* is reported to have struck in 16 feet

water, is said to be situated in lat. 0° 55′ N., long. 96° 48′ E.; reported as lying 40 miles westward of Pulo Nias.

291.—CHINA SEA.—*Tambelan Islands.—Bank South-Eastward of Camels Hump.*—This danger (*Gesine Brons bank*) reported by the master of the German ship *Gesine Brons*, who passed it at the distance of one mile, in March, 1879 (on the passage from Singapore to Hong Kong), appeared to have little water on it. Position as given, lat. 1° 10′ N., long. 106° 57′ E.

292.—CHINA SEA.—*Carimata Strait.—Montaran Islands.—Sunken Danger North-West of Napier Island.*—This danger (*Lenore reef*) on which the barque *Lenore* was wrecked in July, 1878, is reported to be steep-to with a depth of about 2 fathoms on it, and to lie with the following bearings, viz.:—Nangka island, N.E. ½ N.; Napier island, S.E. by E. These bearings place the reef approximately in lat. 2° 37′ S., long. 108° 30′ E. *Variation,* 1¼° *E.*

293.—AUSTRALIA.—*East Coast.—Reported Sunken Danger in Trinity Bay.*—The existence of a coral reef, with about 6 feet on it at low water spring tides, situated in Trinity bay, has been reported. From the position of this danger (on which the steamship *Egmont* recently struck), Low island lighthouse bears N. ½ W., and Island point, N.W. by W. ½ W. A depth of 7 fathoms was found close to this danger. *Variation,* 6½° *E.*

294.—AUSTRALIA.—*Torres Strait.—Reported Rock in Prince of Wales Channel.*—A dangerous sunken rock is said to lie in the western entrance to Prince of Wales channel, Torres strait, and nearly in the track recommended. This rock on which the ship *Canon Harrison* is reported to have grounded on 8th June, 1879 (when proceeding from Newcastle, N.S.W., to Bombay), has on it a depth of about 16 feet at low water, and is about 35 yards in circumference, with depths of 6½ and 8 fathoms close to. From the rock, as stated by the master of the *Canon Harrison*, Hammond rock bears N.E. by E. ¾ E.; Ipili reef E. ½ N.; Goode island, south-west extreme, S.E. ½ S.; and White rocks N.W. ¾ W. These bearings place the rock in lat. 10° 32′ 35″ S., long. 142° 8′ 10″ E. *Variation,* 4¾° *E.*

295.—NEW ZEALAND.—*North Island.—East Coast.—Discon-*

tinuance of Tararu Point Light.—Since 31st May, 1879, the light (fixed red) exhibited from the outer extremity of Tararu wharf, Thames river north entrance point, has been discontinued.

296.—New Zealand.—*North Island.—West Coast.—Light at Patea River Entrance.*—Exhibited from a lighthouse erected on the eastern side of the entrance. It is a *fixed red* light, elevated 130 feet above high water, and visible about 5 miles. Position, lat. 39° 46′ 45″ S., long. 174° 31′ 15″ E.

297.—New Zealand.—*Middle Island.—East Coast.—Danger Signals at Oamaru.*—The following danger signals are shown from a flagstaff on the cliff immediately south of the breakwater at Oamaru: —*Put to sea or keep at sea:*—By day: Two balls horizontal on yard, on either side of mast.—By night: Two white lights placed horizontally, with a red light between them.

Note.—In bad weather the green light at the extremity of the breakwater cannot be shown. As the danger signals have at times to be made during calm weather, mariners must exercise judgment as to the practicability of proceeding to sea from the roadstead.

298.—North America.—*British Columbia.—Chatham Sound.—Sunken danger in Brown Passage.*—The existence of a sunken rock in the fairway of the western entrance to Brown passage, has been reported. This danger (*Stenhouse shoal*) is said to be about 50 yards in extent, and was observed by the U.S. ship of war *Alaska* when passing it at the distance of half a mile (during a heavy south-westerly swell), to break heavily; there is considered to be a depth of about 8 feet upon it at low water. From Stenhouse shoal, Hanmer rocks bear E. by N. ¼ N., distant 5 miles; and Connel islands (south extreme), N. ¾ W., distant nearly 4 miles. These bearings would place the shoal (approximately) in lat. 54° 20′ 36″ N., long. 130° 58′ W. *Variation,* 27¼° *E.*

299.—West Indies.—*British Guiana.—Alteration in Position of Demerara Light-Vessel.*—From the present position of the light-vessel, stationed off the entrance to Demerara river, the lighthouse at Georgetown bears S. 28½° W., distant 12 miles. When the light-vessel is taken into harbour for repairs, a schooner is

put in her place. Position as given, lat. 6° 59′ 30″ N., long. 58° 5′ 30″ W.

300.—WEST INDIES.—*British Guiana.—Light at George Town Lighthouse.*—A *red* light is shown from the lighthouse in the fort at George town, east side of entrance to Demerara river. This light (shown in the direction of the breakwater at the north-west angle of the fort) is visible between the bearings of S. by E. and S.E.; it should be seen 3 or 4 miles.

Note.—When this red light is in sight, a vessel will be to the westward and clear of the end of the breakwater. *Variation, 1¼° E.*

301.—WEST INDIES.—*Curaçao Island.—Light on Little Curaçao Island.*—It is a *fixed* and *flashing* light, showing one flash of six seconds' duration in every minute, preceded by an interval of *seven seconds* darkness; elevated 75 feet above high water, and visible 14 miles. The lighthouse is a round tower, painted white, and stands in the middle of the island between and adjoining two dwellings, each of which is two stories high, and has a red roof. The pedestal of the lantern, under the framework, is painted blue, and the top of the lantern red. Position, as given, lat. 11° 58′ 20″ N., long. 68° 38′ 20″ W.

Note.—The light formerly exhibited from the old light tower, and also the auxiliary light shown from the north-west side of the new tower were discontinued on the 7th June, 1879.

302.—WEST INDIES.—*Martinique Island.—Range of Visibility of Caravelle Light.*—In consequence of the illuminating apparatus at Caravelle lighthouse being out of repair, the light (*fixed*) can only be seen in clear weather from a distance of 12 miles.

Note—It is intended to substitute a new illuminating apparatus for that now in use.

303.—WEST INDIES.—*British Honduras.—Belize Harbour.*—Note the following *alterations* in the lights exhibited in the approaches to Belize harbour :—

1. *Range of visibility of half-moon Cay Light.*—The *fixed white* light, shown from the lighthouse on Half-moon cay, is exhibited from an elevation of 70 feet above high water, and should be visible in clear weather from a distance of 12 miles. The skeleton

iron light-tower, from which the light is exhibited, is 80 feet high.

2. *Range of visibility of Cay Bokel Light.*—The two fixed lights (*white* and *red*), shown from a mast on cay Bokel, south extreme of Turneffe islands, are exhibited from an elevation of 60 feet above high water, and should be visible in clear weather from distances of 8 and 5 miles respectively.

3. *Alteration in English Cay Light.*—From a mast, painted white, erected on English cay, a *fixed white* light is exhibited from an elevation of 45 feet above high water, visible in clear weather from a distance of 7 miles. The two lights previously shown have been discontinued.

804.—United States.—*Massachusetts.—Signal Buoy off Chatham.*—An automatic signal-buoy, painted red, and giving blasts of a whistle at short intervals, has been moored in six fathoms water. Magnetic bearings of prominent objects are as follows:—Chatham lights, W. ¾ S.; Pollock rip light-ship, S. by W. ¼ W.; Monomoy point lighthouse, S.W. ¾ S.

805.—United States.—*Gulf of Maine.—Discovery of Ledge.*—The *U. S. S. Portsmouth* grounded, while attempting to tack off Brave Boat harbour, upon a *ledge* which is neither marked on charts nor mentioned in sailing directions. The following bearings were taken from the ship while aground on the ledge:—Boon island lighthouse, E. ¼ S.; Spindle on Stone's rock, N.E. ¼ E.; White island lighthouse, S. ⅜ W.; Spindle on York ledge, E.S.E. ⅛ E. These bearings place the ledge upwards of 3 cables from shore, and where the chart shows 7½ fathoms. *Variation*, 12½° *W.*

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1879.

No. 13.—Pacific Ocean, Notice 48, Western Part; information relating to islands in the South Pacific.

No. 14.—Australia Directory, Vol. III., Notice 10; information concerning the north-west coast of Australia, and certain islets and off-lying reefs.

No. 15.—Persian Gulf Pilot, Notice No. 3, Arabian coast.

No. 16.—South America Pilot, Part II., Notice 8; various information respecting the south and west coasts from Tierra del Fuego to Ecuador.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1879.

(*This List is completed to the* 18*th of each Month.*)

346. *Albert Edward*, s.s.; built at Poplar, 1862; owned by the South-Eastern Railway Company; tonnage, 221; Folkestone to Boulogne; passengers. Inquiry held at Westminster, August 15, 1879, into the circumstances attending the loss of life which occurred on lowering a boat at sea, July 22, 1879; before Rothery, Wreck Commissioner; Grant and Castle, N.A. Court held that the boats provided were in accordance with the requirements of the Merchant Shipping Act, but that smaller boats would have been more effective; that the boats would be more readily available if hung on davits instead of being stowed inboard on chocks; that the after tackle of the starboard lifeboat was defective by reason of the number of leads through which the fall passed, and that this was the main cause of the boat having been broken in half, the forward fall having been allowed to run out, whilst the after one was jammed. Master and managing owner to blame for not having taken proper measures to ensure the boats being in a proper condition, and readily available whenever required. The Court was not asked to deal with the certificates of either master or mate.

349. *North British*, s.s.; iron; built at Glasgow, 1872; owned by Mr. R. Henderson and others, of Belfast; tonnage, 819; Silloth to Dublin; cargo, sheep and passengers; lost on Clay Head, Isle of Man, July 20, 1879. Inquiry held at Glasgow, August 11, 1879, before Rothery, Wreck Commissioner; Powell and Ward, N.A. Court held that the master was alone

responsible for the accident, but under the circumstances returned him his certificate.

350. *Zephyrus*, ship; built at East Stonehouse, 1869; owned by Cliffe and Son, Liverpool; tonnage, 699; Savannah to Liverpool; sugar, &c.; lost at the entrance of Cymmeran River, Isle of Anglesea, July 14, 1879. Inquiry held at Liverpool, August 7, 1879, before Rothery, Wreck Commissioner; Powell and Wilson, N.A. Master in default for not making allowance for the set of the tide and indraught into Carnarvon Bay, for setting improper courses, and for not using the lead. Certificate suspended for six months, during which time he was recommended for one as mate.

351. *Hispania*, s.s.; built at Greenock, 1870; owned by Mr. J. Ellis, of Liverpool; tonnage, 263; Liverpool to Bristol; general cargo; stranded on Scarweather Sand, Bristol Channel, July 17, 1879. Inquiry held at Liverpool, August 8, 1879, befory Rothery, Wreck Commissioner; Powell and Wilson, N.A. Stranding of vessel caused by steering improper courses, and from not making allowance for the strong ebb-tide that was running. Master and mate both to blame. Certificates suspended for six and three months respectively.

353. *Bessie* and *Jane*; the former a schooner, built at Towey, 1863; owned by D. W. Bain and others; tonnage, 144; Middlesborough to Briton Ferry; pig iron. The latter a fishing boat; owned by C. Cload; of from 8 to 10 tons; in collision whilst the fishing boat was at anchor near the Eddystone Lighthouse, July 11, 1879, where one life was lost. Inquiry held at Plymouth, August 19, 1879, before Rothery, Wreck Commissioner; Aplin and Beasley, N.A. Accident caused through there being no proper look-out kept on board either vessel, and also from the insufficiency of the light exhibited on board the *Jane*. Masters of both vessels to blame for the collision, and master of *Bessie* in default for not having made every endeavour to save the life of the master of the *Jane*.

358. *Semiramide*, s.s., and *Corsica*, s.s.; the former built at Low Walker, 1877; owned by Mr. R. Tully, of Newcastle; tonnage, 1,732; Boston to Liverpool; cattle and general cargo.

The latter built at Govan, 1863; owned by Mr. R. Fell, of Newcastle; tonnage, 1,466; Bristol to New York; ballast. In collision 120 miles W.S.W. of the Fastnet, August 12, 1879, through which the *Semiramide* foundered. Inquiry held at Liverpool, August 25, 1879, before Mansfield, Judge; Powell and Curling, N.A. Court held both masters free from default; but blamed the two chief officers, who were at the time in charge, for not at once each slackening speed when sighting the approaching vessel, and suspended their certificates for three months.

362. *Samuel Plimsoll* and *Orlando*, s.s.; the former a ketch, built at Rye, 1876; owned by Mr. R. Frayne; tonnage, 72; on a fishing voyage. The latter built at Hull, 1870; tonnage, 1,031; in collision on the Dogger Bank, August 9, 1879, when the *Samuel Plimsoll* was sunk and four lives were lost. Inquiry held at Hull, August 28, 1879, before Travis, Stip. Mag., Knox and Sceales, N.A. Accident caused solely by the default of the second mate of the steamer in starboarding his helm after sighting the smack instead of continuing his course. Certificate suspended for eighteen months.

363. *Camperdown*, ship; built at St. John's, N.B., 1860; owned by Mr. G. de Wolf, of Liverpool; tonnage, 1293; Hudiksvall to Bristol; timber; stranded upon Finngrunden Shoals, Gulf of Bothnia, August 8, 1879. Inquiry held at Liverpool, August 30, 1879, before Raffles, Stip. Mag.; Aplin and Wilson, N.A. Master in default for neglecting to use the lead. Certificate suspended for three months, but recommended for one as mate during that period.

365. *Maipu*, barque; built at Birkenhead, 1865; owned by Mr. John Laird, junr., and others; tonnage, 593; Iquique to Hamburgh; saltpetre; lost on the Scilly Isles, July 27, 1879. Inquiry held at Liverpool, August 27, 1879, before Rothery, Wreck Commissioner; Aplin and Wilson, N.A. Master to blame for the casualty in neglecting to use the lead, for steering improper courses, and not making allowance for the set of the tide. Certificate suspended for three months, but recommended for one as mate during his suspension.

366. *River Lune*, iron; built at Wallsend, 1868; owned by

Mr. J. Hargrove, of Liverpool; tonnage, 1163; L'Orient to Ardrossan; ballast; lost on the Scilly Isles, July 27, 1879. Inquiry held at Liverpool, August 26, 1879, before Rothery, Wreck Commissioner; Aplin and Wilson, N.A. Casualty due to the vessel having been kept too long on a N.W. course, and from a neglect to use the lead, also from no allowance having been made for the set of the tide. Master in default. Certificate suspended for three months.

367. *Burgos*, s.s.; built at Stockton, 1870; owned by Richardson, Buck & Co.; tonnage, 1,152; Montreal to London; stranded in St. Mary's Bay, Newfoundland, July 14, 1879. Inquiry held at Hull, September 3, 1879, before Travis, Judge; Knox and Sceales, N.A. Master to blame for improper navigation and want of due precaution. Certificate suspended for four months.

368. *Zurich*, wood; built at New York, 1844; owned by Mr. W. Hutchinson; tonnage, 691; Tyne to Spezzia; coal; stranded on the Hasbro' Sands, August 13, 1879. Inquiry held at North Shields, August 29, 1879, before Cleugh and Swan, Justices; Powell and Castle, N.A. Master in default for continuing too long on the port tack and for neglect of the lead. Certificate suspended for nine months; recommended for one as mate during that time.

370. *Georgina*, schooner; built at St. Malo; owned by Mr. B. Gales, of Whitby; tonnage, 360; Grydo (Norway) to Archangel; ballast; lost on a sunken rock near Buroer Island, Lofoden Group, July 27, 1879. Inquiry held at North Shields, September 3, 1879, before Spence and Jackson, Justices; Powell and Castle, N.A. Master guilty of error of judgment, and mate in default for not seeing that a proper look-out was kept. Certificate suspended for three months.

371. *Avon*, s.s.; built at Bristol, 1844; owned by Mr. J. Heathcock, of Liverpool; tonnage, 102; stranded on Burren Rock, Lambay Island, August 12, 1879. Inquiry held at Dublin, August 30, 1879, before O'Donnel, Judge; Burney and Curling, N.A. Master guilty of grave error of judgment, for which the Court severely reprimanded him, and returned his certificate.

Official Inquiries Abroad.

345. *Benmore*, s.s., and a Chinese junk; in collision off Pulo Pankore, May 17, 1879. Inquiry held at Penang, May 21, 1879. Casualty caused by careless navigation on the part of the chief mate of the steamer, whose certificate was suspended for six months. The master was also censured for leaving the vessel in charge of the mate without any specific instructions.

347. *Shun-Lee*, s.s.; wrecked on the South East Promontory, June 14, 1879. Naval Court held at Chefoo, June 26, 1879. Casualty due to foggy weather.

348. *Sandhurst*, ship; destroyed by fire at sea, February 15, 1879. Inquiry held at Penang, May 18, 1879. Accident caused by the careless act of the steward; but it was considered that the ship might have been saved had it not been for the steam-pump becoming useless through turning on too great a-head of steam suddenly. Master commended for the ability displayed in saving passengers and crew, having had to traverse some 900 miles in an open boat.

352. *Morning Star*, brig; lost in the Bosphorus. Casualty due to the brig having been cast off by the tug *Danube*, without warning, and when all sails were furled. Master's certificate returned, but it was pointed out that had he endeavoured to wear his vessel he might have avoided the rocks. Cautioned.

354. *Monaro*, s.s.; lost near Binge Binge Head, May 29, 1879. Inquiry held at Sydney, June 16, 1879. Casualty caused by the joint carelessness of master and mate. Certificates suspended respectively for six months.

355. *James Comrie*, s.s.; stranded at Salt Creek Spit, Gulf of St. Vincent, May 28, 1879. Inquiry held at Adelaide. Master in default for not using the lead and for not having the binnacle lamps lighted. Severely censured.

356. *Lizzie*, s.s.; stranded at Bridgehampton, Long Island, August 1st, 1879. Naval Court held at New York, August 6, 1879. Master much to blame in not personally attending to the navigation of the ship when so close to the land, and was reprimanded. Second mate's certificate suspended for three months

for altering ship's course without master's sanction, and for not informing him when the weather became thick.

357. *Ocean Wave*, ketch; lost on Tuggerah Point Reef, May 27, 1879. Inquiry held at Sydney, June 16, 1879. Mate in default, who was uncertificated.

359. *Shepherdess*, schooner; stranded in the Harbour of Kaikoura, May 27, 1879. Inquiry held at Kaikoura, May 30, 1879. Casualty due to the defective condition of the moorings. No blame attached to master.

360. *Swallow*, barquentine; lost on rocks in Tory's Channel, Cook's Strait, June 28, 1879. Inquiry held, Picton, July 1, 1879. Accident caused by the gross neglect of master. Certificate suspended for three months.

361. *Adela*, s.s.; grounded in the Harbour of Newcastle, N.S.W., June 24, 1879. Inquiry held at Newcastle, July 4, 1879. Casualty caused by the vessel swinging athwart the tide and grounding on her anchor. Master censured for inattention to duty.

364. *Lovet Peacock*, schooner; lost in Newcastle Harbour, June 18, 1879. Inquiry held at Newcastle, June 21, 1879. No evidence adduced on which to found a charge against master.

372. *Kingston*, ship; wrecked on a reef off Cape Roumania, June 21, 1879. Inquiry held at Singapore, 8th July, 1879. Master guilty of an error of judgment, for which the Court severely censured him.

378. *Condor*, schooner; foundered at sea, May 21, 1879. Inquiry held at Rangoon, June 30, 1879. Casualty caused by stress of weather.

GENERAL.

"HANNAH LOUISA." — MERITORIOUS ROCKET SERVICE. — The dandy, *Hannah Louisa*, of Chepstow, ran ashore at Perran Beach, 4½ miles from the St. Agnes Station in the Padstow Division, on the 1st of August last, and fifteen men of the Volunteer Life Company, with four coastguards and six assistants, at once proceeded to the scene of the wreck; but, being very early in the morning, three o'clock, only one horse was obtainable and traces had to be made with drag ropes. The two horses on which messengers were sent to hurry the arrival of the apparatus, were pressed into service, and on reaching the shore opposite to the wreck, although the hawser did not reach the vessel without the end of the tackle fall being bent on, communication was effected by the first rocket, and the whole of the crew, four in number, were safely landed within twenty-five minutes from the time the rocket was fired.

LOG BOOKS TO BE PRODUCED IN FRENCH PORTS.—NOTICE TO SHIPMASTERS.—The French Government have informed the Foreign Office, that Article 7, of the French Law of 2nd July, 1836, by which all masters of vessels entering French ports are required to produce their log books to the Custom House officers, on pain of a heavy penalty, will in future be enforced.

URGENT SIGNALS (RIVER THAMES.)—The Board of Trade have authorised the use of the following signals when the master of a ship desires the attendance of the Board of Trade officer, or urgently requires the assistance of the police in the River Thames.

The signals can be made by foreign as well as by British ships.

"*Want the Board of Trade Officer.*"—Ensign of whatever nationality, hoisted at the main.

"*Want Police.*"—The flag commonly known as "Blue Peter," being letter P of the International Code, hoisted at the main.

The signal should be kept hoisted, until it is answered.

Note.—The *Midge* has a black hull, a cream-coloured funnel, and wears the Board of Trade flag, which is a blue ensign, with a merchant ship in a circle, in the fly.

INDIA.—STORM SIGNALS AT CALCUTTA.—A new set of storm signals for the Port of Calcutta and its approaches has been published. For the approaches to the port, when there is bad weather in the Bay of Bengal, the following signals will be hoisted at the flagstaff near the lighthouse on Saugor Island, at Mud Point, and at the flagstaff, Diamond Harbour, near the telegraph station, on receipt of instructions telegraphed from the Meteorological Office, Calcutta:—During the day a single cone indicates that bad weather (such as usually precedes, but is not always followed by a cyclone) is probably prevalent in the bay. A black double cone indicates that the passage of a cyclone is probable, as a cyclonic vortex is believed to have been formed in the bay. When this signal is up Pilots will not put to sea unless, in their judgment, the local weather symptoms are such that this course is not imprudent; and unless the master, concurring in this opinion, distinctly takes upon himself the responsibility of going to sea, and gives the pilot a writing to that effect. A black drum indicates that a cyclone is probably approaching. When this signal is hoisted masters or pilots in charge of vessels are forbidden to put to sea from Saugor, or to proceed down from Diamond Harbour, and should make their vessels as snug and secure as possible. At night two lights in a vertical line indicate a cyclonic disturbance in the bay, three lights in a triangle that a cyclone is probable, four lights in a square that a cyclone is approaching. For the port of Calcutta, during the day, a double cone hoisted on the arm of the flagstaff near the Government Dockyard at Kidderpur, and on the yardarm of the flagstaff on the roof of the Sailors' Home, on the receipt of instructions from the Meteorological Department, indicate that a cyclone is probable, and a drum that a cyclone is approaching; whilst at night three lights in a triangle indicate the former, and four lights in a square the latter.

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ON INTERNATIONAL CONVENTIONS FOR THE MAINTENANCE OF SEA-LIGHTS.*

THE title of the present communication may seem at first sight to involve an innovation upon the established practice of nations, under which the members of the European family admit it to be a primary duty on the part of each nation to light up its coasts to passing vessels, so as to enable them to avoid shipwreck upon outlying reefs and shoals, of the vicinity of which they would otherwise have no sufficient warning at night. Hardly anything is to be found on the subject of this duty in the works of writers on public law, and Grotius is content with laying down the principle, that it is not contrary to the right of nature and of nations that those who take upon themselves the burden of protecting the navigation of the high seas by lights at night, or by sea-marks so placed as to give warning by day of rocks and shoals, should impose an equitable toll upon all who benefit by such aids to navigation. But the

* Paper read by Sir Travers Twiss, D.C.L., F.R.S., at the Seventh Annual Conference of the Association for the Reform and Codification of the Law of Nations, held in the Guildhall of the Corporation of the City of London, 1879.

subject of lighting up the coasts of each nation has acquired a general importance of a somewhat unforeseen character since the days of Grotius. The successful application of steam-power to ocean navigation, which may be regarded as the great maritime discovery of the present century, is the complement of the invention of the mariner's compass, by which I mean, not the discovery of the property of the loadstone, but the scientific combination of the magnetic needle with the mariner's card and the compass-box. This latter invention may be referred with great probability to the latter part of the thirteenth century or the beginning of the fourteenth, and it was a necessary condition precedent to the perilous voyage of adventure into the unknown depths of the Atlantic, which resulted in the discovery of a new world by the energy of Christopher Columbus in the latter part of the fifteenth century.

The application of the loadstone to purposes of navigation seems to have been familiar to the Chinese at a very early period, so much so that there are writers who contend that the knowledge of the mariner's compass was brought to Europe from China by Marco Polo. It may be true that Marco Polo may have brought with him from China the knowledge that a mariner's compass * was in use amongst the navigators of the Eastern seas, although he does not mention the fact in his published narrative; but writers of an earlier date than Marco Polo speak of the mariner's needle being in use amongst the Mediterranean mariners in the time of the Crusades. The lighthouse, on the other hand, is undoubtedly an invention of the European mind, although in a certain sense it is of African origin, for the Pharos of Alexandria, the first light-tower of its kind, was built under the direction of Ptolemy, the son of Lagos, the founder of the Greek dynasty of Egyptian kings, and from the design of a Greek architect, Sosthenes of Cnidus. This light-tower was completed in the reign of Ptolemy Philadelphus, about 283 B.C., and its cost is said to have amounted to 800 talents, the equivalent of more

* The card of the Chinese compass in use in the last century was divided into twenty-four points, whilst that of the European compass has thirty-two.

than a quarter of a million of pounds sterling. The light-tower itself consisted of several stories, furnished with windows looking seawards, and on the floor of the uppermost story a wood fire was kept burning during the night, the flame of which sufficed to light vessels into the harbour of Alexandria. If the statement of the Jewish historian Josephus can be relied upon as trustworthy, that the fire of this lighthouse was visible at a distance of about thirty-four English miles,* we can hardly resist the conclusion that metallic mirrors must have been employed to direct the rays of light seawards; and from what we know of the skill of the Greek engineers, who by means of metallic mirrors set fire to the works of the Romans when they besieged Syracuse at a later period of the same century, there is no great difficulty in supposing that metallic mirrors were in use in the Pharos of Alexandria. It is not unimportant to bear in mind that, as the Pharos itself gave its name to the lighthouses, which I shall presently mention, as set up in Europe by the Romans, so the Greek tongue has supplied the distinguishing terms for the parabolic reflector and the catoptric system of lights, which were in general use in European lighthouses in the latter part of the last century, before the dioptric system of Augustin Fresnel, the distinguished French Academician, superseded them in the more important light-towers.

When Julius Cæsar laid siege to the city of Alexandria, at that time the great entrepôt of trade between Europe and the far East, the rapid prosperity of which was the most striking testimony to the genius of Alexander the Great, his chief assault was made upon the island of Pharos, at that time united by a causeway to Alexandria, and against its light-tower, which he captured after some difficulty. He has given a brief account of the Pharos in his history of the civil war,† and Cæsar's countrymen and suc-

* The great distance at which charcoal fires are visible at sea in a serene atmosphere is well known to mariners, who have been accustomed to navigate the seas near the Cape de Verd Islands and the Canaries, where the fires of the charcoal-burners on the hills may be seen at sea at a distance of twenty-five miles.

† C. Julii Cæsaris *de Bello Civili*, lib. iii. chap. cxii. It has been calculated that the Pharos of Alexandria was 550 feet in height, but according

cessors were not slow to appreciate the value of such a structure. Their works, or traces of them, exist in the present day. The pharos which still stands within the precincts of Dover Castle, and which is known by the name of "Cæsar's Altar," is supposed to have been built by the Romans some time before 53 A.D., and its counterpart, on the opposite side of the Straits, is found at Gessoriacum, on the high land above Boulogne, in the tower which is known in the present day by the name of "La Tour d'Ordre." The chief Roman ports, such as Ostia, at the mouth of the Tiber, Ravenna, the great military port of the Adriatic, and Brundusium, which still continues to be the most convenient port of communication between Italy and the Levant, had each its pharos, built upon an island adjacent to the mainland. I pass by other famous lighthouses of Roman construction, for most of such lighthouses were limited in their object, for the best of reasons, that they were limited in their means of usefulness, inasmuch as the lighthouse of ancient days had no pretensions to be anything more than a lighted torch, protected from the wind and kept burning on a tower sufficiently high for it to be visible to vessels approaching a given port at a sufficient distance to warn them of the dangers which beset its entrance.

The connecting link between the ancient and modern systems of lighthouses is to be found in a light-tower of which the structure is as noble of its kind as the Pharos of Alexandria; I mean "La Tour de Cordouan," which is built upon a ridge of rocks running out into the Bay of Biscay, on the southern side of the entrance of the river Gironde. The tradition is that the site of the present light-tower was the site of a lighthouse erected by Louis le Debonnaire in the ninth century, which was rebuilt on a larger scale by Edward, Prince of Wales, surnamed the Black Prince, in 1370, when Guienne was appendant to the English crown, and which was again rebuilt in its present magnificent

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to the nautical mode of calculating the distance at which objects are visible from a ship's deck at sea, the Pharos must have been upwards of 800 feet in height to allow of the light being visible at the distance of 34 miles.

dimensions during the reigns of Henri III. and Henri IV. of France, after the design of Louis de Foix, and at the expense of the province of Guienne. The building of this tower, which is 220 feet in height, was no slight enterprise of itself. Its construction, for it consists of three distinct stories of different orders of Greek architecture resting on a circular case-mated base, occupied a quarter of a century; and when it was completed, the light was supplied by a fire of oak logs kindled on a "chauffoir" at the top of the tower. The use of coals was the first improvement introduced. Then came a rude reflector in the form of an inverted cone to prevent the dispersion of the rays of light. It was not, however, until the latter part of the last century that the use of oil-lamps and parabolic reflectors was substituted, and at last in 1822 the dioptric system of lenses, invented by Augustin Fresnel, who has been already mentioned, was adopted. The present system of lights is a combination of catoptric mirrors with dioptric lenses, and is termed the cata-dioptric system. This magnificent light-tower, as now fitted up, serves not merely to warn vessels of the dangers which beset the entrance of the river Gironde, but it serves as a guide to passing vessels, bound to various ports of the Bay of Biscay, or trading between the northern ports of Spain and the ports of the North Sea, as its light is visible at a distance of ten French leagues. It would thus appear that the same country which gave to the mariners of the Atlantic and of the North Sea their earliest sea laws—I allude to the sea laws of the island of Oleron,* which lies a little to the north of the entrance of the River Gironde—was the first to revive, for the aid of the same body of mariners, the use of the light-tower to assist them at night in their navigation near a most dangerous coast.

I have ventured to speak of "La Tour de Cordouan" as the most magnificent of modern light-towers. It is not, however, the most wonderful of such structures. It has been said, with what justice I am not at present concerned to decide, that the French nation has kept the lead of Europe in originating the greatest discoveries of modern science, whilst the English nation has adopted

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* Pardessus, *Lois Maritimes*, tom i., Paris, 1828.

and brought to perfection most of those great discoveries. I have already assigned to Guienne the credit of having originated the earliest compilation of sea laws, known as the Rolls of Oleron, as well as the merit of reviving the idea of a pharos or lofty light-tower, built upon an outlying reef of rocks, and illuminating far and wide the shoal waters of a dangerous coast. But just as England adopted the sea laws of Oleron, and gave them currency in the British and North Seas,* so she has adopted and perfected the system of constructing light-towers on dangerous reefs situated far in advance of the mainland, and invisible to the eye of the mariner by day equally as by night, being in some cases below the high-water surface of the sea. The Eddystone lighthouse may be cited as the earliest instance of such a light-tower, set up on the Eddystone Rocks, distant about nine miles and a half from the Rame Head, on the coast of Cornwall. It is not necessary on this occasion to weigh the comparative claims to the gratitude of ship-owners and merchants of Winstanley, the designer of the first light-tower, which was washed away in a storm in 1703; of Rudyerd, the constructor of the second light-tower, which was destroyed by fire in 1755; or of Smeaton, the architect of the present light-tower. Each accomplished a great task in his day. The work of Smeaton was completed in 1759, and his remarkable tower still stands, as far as its structure is concerned, uninjured by the ceaseless thrust of the Atlantic surge, and apparently indestructible, were it not the fact that the very reef on which it stands is made of more perishable materials, and has become undermined by the action of the waves.† Other light-towers deserve to be mentioned which Great Britain has constructed at her own expense upon reefs far beyond the limits of her territorial waters. The dangerous reef known as the Inch Cape or Bell Rock, so long a terror to mariners, is more than twelve miles distant from the Scotch coast, and the foundations of the light-tower which rest on that reef are covered to the depth of sixteen feet by the high water of spring

* *Black Book of the Admiralty*, Rolls edition, 1871.

† It is this circumstance which entails the necessity of building a new lighthouse in the immediate neighbourhood of Smeaton's tower.

tides. The erection of this lighthouse, in 1810, was the great triumph of Mr. Robert Stevenson, the engineer of the Northern Lighthouse Board; whilst the Skerryvore Light-tower, built at a subsequent period, upon a rock of compact gneiss, rising abruptly out of the deep waters of the Atlantic at the distance of about twelve miles from the extreme western part of Argyllshire, is the engineering trophy of Mr. Alan Stevenson. The Skerryvore light-tower was completed in 1844, in the face of the greatest difficulties, and the design of it was an adaptation of Smeaton's Eddystone tower to the peculiar situation and circumstances of the Skerryvore rocks.*

I have alluded to these remarkable light-towers as evidence of the power of modern science to overcome difficulties which to the ancients would have been insuperable, and also in illustration of the fact that the modern lighthouse is an institution capable in certain cases of producing such great international benefit, that its erection and maintenance may well deserve the co-operative action of civilised states. The point to which the attention of the governments may with propriety be directed is to secure that sea-lights are maintained in a satisfactory condition, and are trustworthy. The very essence of the value of sea-lights is that they should indicate their purposes with unfailing regularity and efficiency, and there is some reason to suppose that in many parts of the world the lights are not maintained in a condition altogether satisfactory, and a question has suggested itself to nautical men, whether an international commission might not be vested with some sort of controlling power in regard to inefficient lights, so as to be at liberty to call upon the negligent authority to put matters right.

Allusion has been made to the scanty notices which are found in writers on public law on the subject of lighthouses. Vattel is silent on the subject. Azuni, who published his first work in Italian in 1795, which was re-edited by him in French with additions in 1805, and G. F. von Martens, the originator of the

* The Eddystone tower is 68 feet in height; the Bell Rock tower is 117 feet in height; and the Skerryvore tower is 138 feet 6 inches high.

well-known collection of public treaties, who published a work on the law of nations in Germany in 1796, deal briefly with the subject, in the same spirit in which Grotius maintained the right of the maritime states to require all vessels which anchor on their coasts or come within their ports to contribute towards the expenses which are necessary to secure the safety of their navigation. Accordingly they lay it down that, if fire beacons are kept alight on shore or afloat during the night, and buoys are placed upon the shoals to indicate the deep and shallow water passages, foreign vessels which avail themselves of such aids to navigation may be reasonably required to contribute towards their support. In practice, however, if a foreign vessel merely passes along the coast of a nation without casting anchor within a marine league of the shore or entering any of its harbours, it is not subject to the payment of any dues for coast lights. This practice may be regarded as grounded on two principles: first, that the right of passing peaceably along all portions of the open sea is one of the national rights of nations, and, secondly, that the primary object of light-towers and sea-marks is to guide vessels into the harbours of the neighbouring state, and, it is an accidental result that its lighthouses should contribute to assist the navigation of vessels passing along its coasts. But floating light-ships are of comparatively novel institution, and come under different considerations of public law, as they are frequently moored and maintained in parts of the open sea which are far beyond the limit of a marine league from the nearest coast. For instance, England* maintains a light-vessel on the Galloper Sand, which is twenty-four miles distant from the English shore; a light-vessel on the Kentish Knock Sand, which is twenty miles distant from the Essex coast; a light-vessel on the Varne Sand, which is nearly in mid-channel between the English and French coasts, and is ten miles distant from the English shore; and a light-vessel on the Seven Stones, which is fifteen miles distant from the Land's End; and England has not limited her contribution towards such general aids to navigation to this side of the Atlantic, as she lights the Gulf Stream where it

* *Nautical Magazine* for April, 1878, article "Territorial Waters."

issues from the Gulf of Mexico to all passing vessels by a light-ship on the Bahama Shoals, distant six miles from her coast. I allude to these British lighthouses and light-vessels more especially from having a more accurate knowledge of their details than I possess concerning foreign light-vessels; but it must not be supposed that the other nations of Europe lag behind England in such matters, or that they do not equally with her recognise the fact that in such matters a higher civilisation brings with it higher responsibilities, and imposes upon each member of the family of nations the duty of co-operative action in matters of such general utility.

The view which the nations of Europe have adopted in the present century on the subject of the international duty of states to light up their sea coasts to passing vessels has recently been placed on record in an European treaty, under which Denmark has renounced her long standing practice of levying tolls upon all vessels passing through the Sound and the two Belts. The right of Denmark to levy the Sound dues rested upon an immemorial prescription, of which the evidence was forthcoming in treaties of a period as early as the fourteenth century. It was a legacy of the middle ages, the origin of which is not quite clear,* whether it was founded on an asserted right of empire over the narrow passages between the North Sea and the Baltic, or was a compensation for the expense incurred by the lords of the narrow straits in securing the safe navigation of the Baltic Sea by keeping it clear of pirates and maintaining lights and sea-marks to indicate the navigable channels. Be this as it may, the European powers, in redeeming the payment of the Sound dues for the future under the General Treaty of Copenhagen of March 15, 1857, have placed on record their view of the international duty of the state which controls the sea passages into the Baltic, namely, that it is bound, not merely to maintain in complete efficiency the existing lighthouses and lightships for the service of passing vessels equally as of vessels entering or approaching her ports, but to adopt all improvements in such aids to navigation

* Twiss, *Law of Nations*, vol. i. § 179, "On the Right of the Sea."

and to increase their numbers if found necessary. Sweden also, by a special treaty with Denmark (March 14, 1857), has entered into an engagement to maintain all necessary lights on the coast of Sweden and Norway which facilitate the entrance into the Kattegat, and Denmark has guaranteed the vessels of the signatory powers of the Treaty of Copenhagen from any charge on that account.

I have confined my remarks hitherto to the nations of Europe, but as regards the other quarters, as they are termed, of the globe, the question of sea-lights has an equally important interest. The United States of America, for instance, have entered into an independent treaty with Denmark (April 11, 1875), under which Denmark has undertaken in the same spirit that the passages of the Sound and of the two Belts shall be lighted and buoyed as heretofore, and that such improvements in them as circumstances may require shall be made from time to time without any charges to American vessels and their cargoes. Now it deserves remark that the United States, which disputed for a short time any prescriptive right on the part of Denmark as against a state of the New World, have claimed from Denmark nothing more than they freely give in their turn to all the nations of the world. The lighthouses, floating lights, buoys, and beacons on the whole sea-coasts and lake-coasts and on the rivers of the United States, have been constructed and are maintained by the Federal government under an annual appropriation made by congress for these objects. Thirty years ago, when Mr. Abbott Lawrence, minister of the United States, entered into a correspondence with Lord Palmerston on the subject of the great inequality which exists on the subjects of coast-lights, under the respective systems adopted in the United States and by Great Britain, it appeared that the federal government maintained 270 lighthouses, 30 floating lights, and 1000 buoys, besides fixed beacons.* Since that time there has been a large increase of such aids to navigation, especially on the coasts of the Pacific Ocean, all of which are given to the

* Lawrence's *Wheaton*, edition of 1863, p. 337, note.

use of the world by the United States without tax or charge. This is not an unimportant fact in the bearing which it has upon the action of the Asiatic and African states, which have recently been admitted into the European concert of public law. The state, for instance, which connects Europe immediately with Asia, has adopted the system of charging the expenses of lighting its coasts upon the vessels which frequent its ports. Thus the Ottoman Empire has, I believe, farmed out its sea-lights to a French company which levies light-dues, and light-dues are levied by the Egyptian government on vessels navigating the Red Sea. So also with regard to China. By an article of the Treaty of Tientsin, the Chinese government is authorised to levy on British shipping certain dues named "tonnage dues," in return for which they are to light and buoy the coast, conserve the rivers and harbours, and do generally whatever may be necessary to facilitate the navigation of waters open to foreign trade. Since 1860, under the administration of the maritime customs, which are entirely under the direction of European officers, the lighting of the Chinese coast has made steady progress up to the present time when all the principal places requiring to be lighted have been furnished with sea-lights, some of them of the first order, and constructed upon the most recent and most approved principles of European science. The system of dues, however, is not regulated by any consideration of the use which the shipping may have made of the lights, but all foreign shipping, from whatever direction they may have come, pay the same tonnage dues each time a ship enters a given harbour; coasting vessels, on the other hand, pay them only once in three months. Japan, on the other hand, has adopted the example of the United States of America, and makes no charge upon foreign vessels for lighting the intricate navigation of the surrounding seas. The foreign powers which entered into a common tariff convention with Japan, on June 25, 1866, being Great Britain, France, the United States of America, and Holland, introduced into the convention an article to this effect:—

Article XI.—"The government of Japan will provide all the ports open to foreign trade with such lights, buoys, and

beacons, as may be necessary to render secure the navigation of the approaches to the said ports."

In pursuance of this treaty, Japan has spent upwards of half a million of pounds sterling in fitting out lighthouses and light-vessels during the seven years ending in 1875. Her lighthouse work has been designed by Messrs. D. and T. Stevenson, on the recommendation of the English Board of Trade, and it has been carried into execution by Mr. Richard Henry Brunton with all the improvements devised by European science. An unusual difficulty has had to be grappled with in Japan, namely, the frequency of volcanic disturbances, for which a peculiar contrivance, termed an aseismatic* joint, has been devised, to admit of a certain amount of horizontal movement taking place in a light-tower without affecting the table on which the lighting apparatus rests. The success of this arrangement remains still to be proved, for in the only case of an earthquake which has hitherto happened at Segami (my authority is Mr. Brunton, the engineer, speaking in 1876) the joint upon which the apparatus was intended to work was not in proper order, and the earthquake disarranged the lighting apparatus. I mention this fact in illustration of the great care which the Japanese government has taken to secure the efficiency of their lighthouse system.

So far indeed the two great civilised nations of the far East have acceded effectively to the established practice of the nations of the Western world, as regards the lighting up of their coasts to passing vessels. There are other countries, however, with which Europe has been brought into maritime contact under a system of trade which has grown up since the application of steam to ocean navigation, which are not able to light up their coasts on a scale commensurate to the necessities of the increased commerce of the age, from want of means to meet the expenditure, and there are some countries in which no civilised government exists, which can be called upon to light up certain portions of the sea, which form part of the immediate highway frequented by the great steam-

* The word "aseismatic" is derived from the Greek negative particle *a* and the substantive *seisma*, a shaking.

vessels carrying mails and passengers between Europe and the far East since the opening of the Suez Canal. The successful completion of that great work has revolutionised the course of maritime communication with the East, which was initiated by the enterprise of the Portuguese under Vasco de Gama, and it has not merely brought China and Japan nearer, as it were, to Europe, but it has rendered the east coast of Africa, which was almost a *terra incognita* except to the slave dealer, readily accessible to the general commerce of Europe. This result, however, would not have been accomplished with the rapid success which has attended it, had not the merchant been able to invoke the aid of the steamship, while the steamship has to thread its way along channels unknown in former days to the sailing vessel, and at the eastern extremity of the Gulf of Aden has frequently to contend with the south-west monsoon, against which no sailing vessel could ever hope to make headway. A question arises, How shall we provide for the safe navigation of the steamship along coasts, and amidst islands which are not under the sovereignty of any civilised power? This question has been slightly touched upon in an article in the *Nautical Magazine* for April, 1878. "The canalisation of the Isthmus of Suez," as observed in that article, "has led to a great revolution in the course of trade between Europe and the trans-Isthmian ports of Asia, and the safe navigation of the Red Sea and of the Gulf of Aden has become a matter of paramount interest to the commerce of Europe with Persia, India, China, and Japan, seeing that upwards of three millions of gross tonnage passed through the canal in 1876. This commerce is no longer a monopoly of one or two European states, but it is open to the merchants of all Europe and of all Asia. But what nation shall light up the common seaway for the aid of mariners trading with the East, so as to indicate the dangers which beset the entrance of the Gulf of Aden?" For instance, a light would be highly desirable on Cape Guardafui, at the entrance of the Gulf of Aden, and another light on Ras Hafun, which is a headland a little to the south of the entrance of the same gulf, having a sheltered bay both on the north and on the south side, and upon which numerous steam-vessels have gone

ashore,* coming from the southward with the intention of making a course to Europe by the Red Sea and the Suez Canal. These two points, however, upon which it would be desirable to exhibit lights to ships approaching from the eastward or the southward, are on a barbarous coast, whilst the north-east monsoon renders it impracticable to maintain a light-ship at any moorings off Cape Guardafui. The Somali Arabs are in fact the lords of the soil, the tribal system prevails amongst them, and they do not recognise any suzerain power with which Europe can treat on the subject of a light-tower on Cape Guardafui, where in fact a fort would have to be built and a strong garrison of soldiers maintained to protect the tower and the light-keepers. Ras Hafun, on the other hand, can be more easily protected from attack, and the tribes of the immediate neighbourhood are more friendly to Europeans ; and if we look forward to the opening of trade with the eastern coast of Africa, a light on Ras Hafun will be invaluable to vessels coming from the south-west, whilst, if it be a sufficiently powerful light, it will warn vessels coming from the southward and eastward that they must keep a more northerly course to open the Gulf of Aden, clear of Guardafui. At present, after losing sight of the English light in the Isle of Perim or of the English light at Aden, as the case may be, all the great ocean steamers that have come through the Suez Canal, and are bound to some port of the far east, have to strike across the dark waters of the Arabian Sea, where they

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* A list, with which I have been favoured by the Committee of Lloyd's, shows that during the last six years (1873 to 1878) as many as seven large vessels of commerce, amongst which were five steamships, have been reported as having been wrecked at Cape Guardafui and Ras Hafun :—

AT CAPE GUARDAFUI.

Singapore (st.), Hankow to London.
Kwangchow (st.), Liverpool to Hongkong.
Cashmere (st.), Zanzibar to Aden.
Royal Family, Cardiff to Aden.

AT RAS HAFUN.

Tenasserim (st.), Rangoon to London.
Meikong (st.), Shanghai to Marseilles.
Tribune, Liverpool to Aden.

will see no light-tower until the English light on Cape Comorin, or the English lights on the southern end of Ceylon come in sight; yet all those vessels have to pass either to the north or the south of Minicoy, a small island of the Laccadive group, upon which one of the Peninsular and Oriental steamers has suffered shipwreck. But what nation shall place a light upon Minicoy Island, which is invariably passed, according to the season, very close on the north or south side by every vessel which is bound from the Red Sea either for Ceylon, the Bay of Bengal, the Eastern Archipelago, or China or Japan? And what nation shall light the passage, farther eastward, of Torres Straits and the Arafura Sea, which are dotted with dangers, and are traversed by English, French, Dutch, and German vessels? There are difficulties in the way of any single European power undertaking the duty. Such an enterprise might be reasonably viewed with some jealousy by the other powers, whilst no one power has such a preponderating interest in the question as to feel called upon to undertake the expense of erecting and maintaining the requisite light-towers. For instance, on Minicoy Island, although the light need not be of the highest power, the tower must be of considerable height to overtop the cocoa-nut trees, which are cultivated on the island.* It remains that the great seaway between Europe and the far East, where it does not lie within the territorial waters of any European power, should be lighted up by a common concert between the powers, whose subjects have a common interest in the navigation. There need be no difficulty in arriving at an international concert on such

* The island of Minicoy, according to Findlay's *Directory*, "Indian Ocean" (2nd edition, 1873), is considered by some to belong to the Laccadive group of islands, as it is claimed by the Bebee of Cananore, as the southern islands of the archipelago are. According to Fullerton it is dependent on one of the rajahs of the Malabar coast, who is probably the same with the Bebee of Cananore, as Cananore or Kananur is near Mount Dilly, on the Malabar coast. In *Petermann's Mittheilungen* (Band 18, 1872), there is a full description of the island, with its cocoa-nut plantations, by Captain J. P. Basevi, with a map, which exhibits a dangerous reef almost co-extensive with the island on the north-west. The Peninsular and Oriental Company's steamer *Columbo* was wrecked upon this island in 1862.

a subject. A precedent has been established in the Cape Spartel Convention, to which I am about to allude, and to which the attention of governments may be properly invited, as furnishing a convenient settlement of a question at first sight seemingly surrounded with difficulties.

To those, if there be any amongst us, whose memory can convey them back to the insecurity of the navigation of the Mediterranean Sea off the Barbary coast at the beginning of the present century, it will be a subject of pleasing contrast to find that the Sultan of Morocco and Fez has welcomed an appeal made to him by the European powers in the interest of humanity with a view to light up the African coast at the entrance of the Straits of Gibraltar to passing vessels. A treaty was signed at Tangiers in 1865, and ratified in 1867, under which the Sultan of Morocco and Fez has ordered the construction at his own expense of a lighthouse at Cape Spartel, and has made over the entire direction and administration of the establishment to the representatives of the contracting powers. His Sheriffian Majesty has also undertaken to provide a military guard for the lighthouse and to protect the light-keepers. The contracting parties to this convention are Great Britain, France, Austria, Belgium, Spain, the United States of America, Italy, the Netherlands, Portugal, and Sweden on the one part, and the Sultan of Morocco and Fez on the other part; and the German Empire has recently acceded to the convention by a declaratory act, signed at Tangiers in 1878. "The Sultan of Morocco and Fez having at present no navy either of war or of commerce, the other contracting powers have agreed to pay the expenses necessary for the maintenance and administration of the lighthouse by means of an annual contribution, which shall be equal in amount for each of them.* It is further provided that the delegation to them of the administration of the lighthouse shall in no way affect the rights of property and of sovereignty of the Sultan, whose flag alone shall be hoisted on

* The annual contribution from each power is £60, under the original agreement, amongst the ten powers. The extra contribution of £60 from the German Empire will be applied to improvements.

the tower of the lighthouse." There is still wanting another lighthouse on the ancient Barbary coast of the Mediterranean, to secure the safety of the through traffic on this side of the Suez Canal. A light is wanted on the islet just to the north of Galita Island, off the coast of Tunis. The Sorelle rocks, to the westward of the island, would probably be the best situation, as they would be more in the direct track of vessels bound from the Straits of Gibraltar to Port Saïd; but such a light can only be established and maintained by an international concert after the precedent of the Cape Spartel Convention. There is good reason to believe that the territorial authority is favourable to the erection of such a light-tower, if the maritime powers can agree amongst themselves to defray the expense of its erection and its maintenance. If such a light can be established, the Mediterranean highway to the East will be well lighted up.*

On the other hand, the Red Sea is at present insufficiently lighted, nor can it be reasonably expected that the Khedive of Egypt should light it up adequately to secure the safety of vessels which are beyond his territorial jurisdiction. There are four lights at present in the upper part of the Red Sea;† but, after leaving the Dædalus shoal light, nothing is visible until the English light on the Island of Perim, at the southern extremity of the Red Sea, comes into sight; yet, after quitting the parallel of Jeddah, the shores of the Red Sea are fringed with reefs, which run out some distance seawards on each side, leaving a com-

* Since the above passage was written, I have been informed that the French and Tunisian governments have concluded an arrangement for the erection by those Governments of a lighthouse on the island of Galita. A lighthouse has already been erected at Cape Bon by the Bey of Tunis, to which England has supplied a lantern and the lighting apparatus, and towards the maintenance of which certain dues are charged upon all vessels entering the Tunisian ports.

† The lanterns and lighting apparatus for three of the Red Sea lights have been supplied by England, and dues are collected in respect of Ushruffa, Dædalus, and other lights. A scheme for supplying further lights on the Red Sea is under the joint consideration of the French and British governments.

paratively narrow channel southward of 19¼° N. Three, or even four, lights are needed for the safety of this navigation, but they must be maintained by all commercial nations using this route. If such lights can be established, we shall have got clear of common dangers until we reach the North Indian Sea, where the monsoons determine the normal route of vessels. I have already alluded to the desirability of an international concert to maintain a light-tower on Minicoy Island. If this can be arranged, England, as having the greatest interest in the question, may lend a further helping hand to the security of this part of the common highway, by erecting a lighthouse either on Abdul Keri, an outlying island westward of the island of Socotra, or else on the east end of Socotra itself, which would probably be the most useful position for a light-tower, seeing that steamers arriving from the eastward would have no difficulty in taking the route north of Socotra, leading into the Gulf of Aden, whilst steamers leaving the Gulf of Aden, and going eastward, frequently take that route as a matter of fact, and then make their course to Minicoy Island.* England is probably the power to which the other maritime nations might look to take the initiative in a scheme for constructing and maintaining such a lighthouse by an international concert. Two conditions, however, might reasonably be required on the part of other nations as proper to be inserted in an international convention for such purposes: (1) that England should disclaim all intention to fortify the Island of Minicoy, excepting so far as may be necessary for the security of the light-tower and the safety of the light-keepers; (2) that the contracting powers should engage themselves, each so far as it is concerned, to respect the neutrality of the island and of the lighthouse: and for both these provisions we have precedents in existing international arrangements.

In favour of the first provision, there is a precedent to be found in an arrangement concluded between Great Britain and the

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* This is very nearly the same route which has been followed by sailing vessels ever since the discovery of the monsoon winds by Hippalus, in the reign of the Emperor Claudius.

United States of America in 1850, by Mr. Abbott Lawrence on the part of the United States, and by Lord Palmerston on the part of Great Britain, when Great Britain ceded to the United States a portion of the Horseshoe Reef, near the outlet of Lake Erie, for the purpose of the United States erecting a lighthouse for the advantage of all vessels navigating the lakes, whilst the government of the United States undertook to erect such a lighthouse and to maintain a light thereon, and that no fortification should be erected on the said reef. In favour of the second provision, a precedent is at hand in the Cape Spartel Convention, already cited, in the third article of which the signatory powers engage themselves, "each so far as it is concerned, to respect the neutrality of the lighthouse, and to continue the payment of the contributions destined for its maintenance even in the event (which God forbid) of hostilities breaking out either between them, or between any one of them and the kingdom of Morocco."

It would thus appear that three different systems of public law prevail at present on the subject of lighting the highways of the sea:—

1. The most ancient and the more general condition is, where such lights are supported by duties levied upon vessels entering the ports of the state within whose territory and by whose means the lights have been erected.

2. The more modern and somewhat exceptional case is, where such lights are supported by the state itself within whose territory they have been erected. Such is the condition of the lights on the coasts of the United States of America and of Japan, and of the Bahama group of islands, where there are ten sea-lights maintained by Great Britain, in respect of which no dues are levied, any more than for the light on Cape Pembroke, in the Falkland Islands.

8. The most recent and most exceptional condition is, where such lights are maintained by a joint contribution from the maritime states, the territorial power being unable to erect or to maintain the necessary light-towers or light-vessels, and no sufficient number of vessels entering its ports, upon which any light-duos can be levied.

If we would establish an uniformity of law on the subject, the Cape Spartel Convention is our polar-star to steer by. There are evidently two classes of lights, which come under different considerations of utility, coast-lights and harbour-lights. The former are for the benefit of all passing vessels of every nationality; the latter are of service to a limited class, such as carry on trade with the lighted harbour. Nothing can be more reasonable than that all vessels which trade with any given port should contribute to the maintenance of the lights which enable them to frequent that port in safety, and light-dues in respect of such lights may fairly be charged amongst other port-dues payable by such vessels. But coast-lights are of benefit to all vessels which pass along the sea, the dangers of which are made known to them by the presence of those lights; yet for the most part only such vessels are charged with a payment for such lights as enter some port of the hospitable nation which maintains the coast-lights. This is not equitable; neither is the practice encouraging to nations to light up their coasts adequately to warn passing vessels of its dangers; and, on the other hand, in many cases the funds that might be raised by port-dues will not suffice to support adequate coast-lights, unless the port-lights are so high as to discourage vessels from trading with the ports of the very nation which has lighted up its coasts to passing vessels. I have already alluded to the redemption of the Sound dues under the provisions of an European treaty, by which the nations of Europe and the United States of America have agreed to capitalise those dues, and Denmark, in return for a certain capital sum paid in certain proportions to her by the signatory powers, has agreed to light up the sea-passages between the North Sea and the Baltic without any charge upon foreign vessels. We live in the days of International Postage Conventions and of International Telegraph Conventions. Why should we not hope to see the day arrive when INTERNATIONAL LIGHTHOUSES shall be amongst the trophies of peace, which the civilisation of Europe shall set up amidst the islands of the far East? I have confined my observations on the present occasion to the great highway of commerce connected with the Suez Canal; but I might have

gone southward, on leaving the Gulf of Aden, along the east coast of Africa, which is unfortunately a shoal water coast as we approach Zanzibar, with a strong current setting to the westward, increasing in intensity as we draw near to the Mozambique Channel; or if we pass to the eastward of Madagascar in a course for the islands of Réunion and of Mauritius. There is much room for international co-operation in lighting up certain portions of these African seas, not so much in the interest of shipowners and merchants as in the interest of shipowners and passengers, the latter being of the humblest class, the Indian coolie labourers, of whom some thousands are conveyed every year from ports in the Indian seas to the two islands above mentioned, which contain between them a population of 600,000 coolies, working under what is termed the five-year coolie system, and whose labour contributes to supply Europe with some of the necessaries of the European working-man's life, to wit, sugar and coffee. For instance, a light is much needed on the south-west end of Farquhar Island, to the north of Madagascar, or it would be still more serviceable on the outlying reef, close to which lies the route in the south-west monsoon to Bombay and Karachi; but we are in the present day only on the threshold of the East African question. I have, however, ventured to ask you to cast a glance over the East African seas; for if the civilisation of Europe is to penetrate into the heart of Africa from the east, the first great step will be to secure to the European mariner a safe approach to its shores, and this may be materially furthered by an international concert to light up the dangerous portions of the African seaway.

THE REMAINS OF COLUMBUS.

THE deeply interesting article of Sir Travers Twiss on the Remains of Columbus* will doubtless excite great speculation wherever it is read, and all will agree in saying that it is a pity to disturb the landmarks of history. But while admitting this, the facts which are published relative to the discovery must command the attention of the civilized world, notwithstanding the weight which the decision of the Spanish Royal Academy of History carries with it. In 1857 the writer was stationed at San Domingo, during the siege of the city by Santa Anna, frequently visited the cathedral, and noted how little the fire of the batteries on the opposite side of the river injured the time-honoured walls of the old structure if a chance shot struck it. The Spaniards of the fifteenth century must have been a truly great people, for in all their works they appear to have looked beyond the present, building, as it were, for posterity, as if foreseeing the idleness and degeneracy of their descendants. After a lapse of more than three centuries the mongrel race, who inherit their colonies, still dwell in the original houses, although the effects of climate, war, and natural decay are everywhere visible. They neither build or repair, somewhat resembling the hermit crab in shifting their dwelling when one better adapted to altered circumstances falls in their way. In this particular custom San Domingo, Santa Marta, and Carthagena bear off the palm, for the cities of Mexico and Venezuela show some signs of progress.

It was singular to note the profound ignorance of the San Domingo population in all that relates to the great discoverer, notwithstanding so many reminiscences of him still remained, notably the castle in which he was confined by the mutineers after they had loaded him with chains, the palace of his son Don Diego, and the fortifications formidable alike on the land and seaward sides. However, British seamen under Sir Francis Drake swarmed over the latter

* "Columbus: His Last Resting Place." Trübner & Co. 1879.

and sacked the city, a feat which old Santa Anna often spoke of imitating but failed to attempt it, trusting to famine to do the work.

The alleged discovery of the remains of the Admiral cannot be lightly dismissed, for circumstantial evidence is so strong that every care should be taken to confirm or disprove their identity. When a number of coffins have been long hidden in a vault, and no inscriptions tell who their occupants are, it is not singular, after the lapse of two centuries and a-half, for an error to be made. No value can be attached to the fact that the body which was removed to the Havanna had crumbled to little more than a handful of mould, one bone only remaining intact, while that which has recently been exhumed is comparatively in a good state of preservation. We can only infer from the difference that the leaden chest which contained the latter had been carefully soldered up, for the decay of human bones in a generation, unless exposed to the air, is but trifling. On the other hand, if a fracture allowed the damp, heated air of the tropics to enter, decay would be rapid. The following incident will prove that the bones of a man, when excluded from the effects of the atmosphere, will be in a good state of preservation after the lapse of centuries:—During the Maronite and Druse war in Syria, in 1858-9, the French troops broke open Hiram's tomb. Now the historian of the Holy Land, Dr. Robinson, asserts that it is the best authenticated monument in the country. One dragoman stated that it was believed much treasure had been buried with the great king, but he was unable to say whether any had been found by those who desecrated the tomb. A diligent search was instituted amongst the debris of broken stones within the rude structure, and part of a tibia was discovered. It matters little so far as time is concerned whether it once formed a portion of the body of Hiram, interesting as its identity would be to all Masons, but if history is of any value on such a subject, it may be asserted that for near three thousand years the bone we now hold has remained intact.

Quite recently the coffins of Robert the Bruce and another great warrior of the middle ages were opened in the presence of the authorities. These bodies when Columbus died had been moul-

dering for more than two centuries in the tomb, yet the skeleton of the former was found to be intact, and it is alleged that many of the bystanders wept when they saw the remains of the arm which had driven a battle-axe through the helmet and skull of Bohun on the field of Bannockburn.

Neither does the removal of the body by land and by sea strengthen the opinion of those who look on the presumed finding as a fraud, simply because a handful of mould was only found in the first chest, no proof of antiquity if air had by any means found admission. Doubtless the coffin of Columbus was handled with the care and reverence befitting the illustrious deceased, for at the time the results of his genius were fully patent to the nation who had, despite his foreign nationality, claimed him as a countryman. In the account of the exhumation at San Domingo, in 1795, tradition and the opinion of that mythical individual, the oldest inhabitant, appear to have been more relied on than absolute data. If the plan of the vault, with the position of the coffin had been in the possession of the authorities at the time, it is highly probable that the identity of the body would never have been questioned, but it is acknowledged that the archives had long been destroyed, thus compelling the searchers to rely in a very great measure on circumstantial evidence. The presence of the bullet also opens a wide field for conjecture, notwithstanding the critical disquisition on the proper application of the word "plaga" in that age. It is an historical fact that the Admiral suffered occasionally from the opening of an old wound, which in one so temperate and robust would not be likely to occur unless a foreign substance were lodged in the flesh. On the other hand there is no record that either of the sons suffered in a similar manner, and it is only reasonable to suppose that if such had been the case the fact would not have escaped the notice of the historians of the period, nor is it likely that under such circumstances they would have remained in a climate which is trying to the most robust of men at the present day, notwithstanding the ameliorations which wealth may now procure. Neither could the sons share the enthusiasm of their father, an enthusiasm which enabled him to hopefully persevere amidst poverty and neglect, and to

bear up under secret suffering till his work was done, till the goal had been attained, a new continent discovered, and only the details remained to be worked out by those who followed in his footsteps.

During the siege of the city by Santa Anna, the brother of the President had been killed in a sortie, and high mass was celebrated for the repose of his soul and that of the Archbishop, who died about the same period. We were present, and as the body of the latter, robed in full canonicals, was borne into the cathedral and placed in the choir, with huge wax lights blazing beside it, and the melancholy dirge for the dead pealing from the organ, it required no tax on the imagination to recall another great funeral which, more than two hundred years before, had been celebrated on the same spot under very different conditions. Then all that wealth and pomp and chivalry could command met to honour a great name. Now, a few foreigners and an ill-clad assemblage of dark skins looked on the shrivelled corpse of the Archbishop with indifference or curiosity, for, if report spoke truly, his life had been spent so dissolutely as to hasten his death. At the time it was a subject of congratulation that the Spaniards had not left the grave of Columbus under the charge of such a race, but who can now say positively that they did not; history records greater mistakes.

From the doubts which appear to have existed as to the true position of the coffin of the Admiral, and the exciting circumstances which attended its removal, an error might have been inadvertently committed by the Commissioners in 1795. Grandees might not care to descend into the close vaults of a cathedral, which of itself is almost unbearable to an European, and if any part of the identification were left to subordinates, an exchange would be easy. It would be difficult to impute fraud to any one, for who amongst those who were present had any interest in practising deception, and until that is proved such an assertion can have no weight. The time may come when the pastoral letter of the Bishop of Orope will rank as an historical document, there being strong circumstantial evidence in its favour, and only conjecture to disprove it.

The controversy strongly recalls an incident which occurred

many years since on a remote station. A transport arrived with the body of a youth on board, belonging to the noble family of ——, it was interred in the cemetery amongst the unknown dead, and no care taken to mark the spot. Long afterwards a ship came in with orders from the Home authorities to take up the coffin and place it within a shell sent out for the purpose. All were in a state of violent excitement for no one appeared to be able to indicate the exact position of the grave. The two most important witnesses, the chaplain and the gravedigger, were at issue on the point, the former insisting that it was one which he pointed out, and the other that it pertained to "long Bill" of the ——. The controversy was settled by the senior officer in favour of the chaplain, and, amidst many grumblings from the grave-digger, the coffin was transhipped and ultimately borne to the family vault of the ——. There were many who believed that an error had been committed, but it would have served no purpose to attempt to throw doubts on the identity of the dead, and thus to weaken a sentiment which was satisfied.

In the case of Columbus, however, posterity will not rest until the place of his interment is surely known, for his fame is the common property of civilised men, a fame which will increase as centuries roll on, unspotted as it is with a single incident of violence and bloodshed such as disgraced the conquistadores who followed in his footsteps.

Near the railway wharf at Colon, stands a massive bronze statue of the discoverer in the act of looking placidly down on a beautiful Caril female, who with trustful simplicity appears to be invoking his protection. It had not, in 1873, been placed on a pedestal, and the native authorities of the Isthmus probably allow it to remain so to this day, reminding the spectator as he looks at its surroundings of the words of scripture, "a pearl amongst swine."

It is singular the Americans should have had the bad taste to fasten the name of Aspinwall on the only spot which retained that of Columbus. Surely there are States and territories enough on the continent on which the name of the enterprising New York merchant might have been fastened without displacing a greater

to effect it. English seamen and English merchants, after the lapse of a quarter of a century, still refuse to endorse the change, but it is probable that in a few years more they too must follow the rest of the world. The Americans are a wonderfully practical people, never allowing sentiment to interfere with the every-day business of life, but the want of this reverence for the past, while it may add to material comforts, does so at the sacrifice of some of the noblest feelings of our nature. A few years since Central America contained a large number of beautiful brass guns, on which the engraving was as fresh as when they were turned out from the Royal factory at Seville. Many bore the arms and names of the great warriors and statesmen of the time, and were, in fact, a species of pictorial history, but nothing could save them from the melting pot of the New York brass founder. At Porto Bello, so recently as 1857, several might be seen which had fallen through their wooden carriages many years before. They formed no bad emblem of the race who have succeeded to the heritage of the greatest nation of the middle ages.

W. W. KIDDLE.

SHIP STEEL.

(*Concluded from page* 855.)

SINCE the first part of this article was written the autumnal meeting of the Iron and Steel Institute has been held at Liverpool, and although none of the papers read contained much information of any importance either upon the manufacture or use of steel in ship-building, some valuable remarks were made by speakers in the discussion upon the papers read.

The manufacture of Bessemer steel from Cleveland pig-iron, has, it was said, made considerable progress, and Mr. J. Lowthian Bell, who is well known in connection with the iron manufacture, described at length the testing of steel rails made at Middlesbro' by the new process which we briefly described in the first part of this article. Messrs. Bolckow, Vaughan & Co. have manufactured

a lot of steel rails from Cleveland pig for the North-Eastern Railway Company, and the analysis of specimens selected show an average amount of phosphorus of only ·1 per cent., while in one rail it was only ·04 per cent., the latter being the ordinary percentage in rails made from the best pig-iron. The rails were tested by blows from weights dropped upon them, and the results were so satisfactory that Mr. Bell considers it as proved that steel rails of trustworthy character can now be made of Cleveland iron. The importance of these facts is, that if steel can be produced at moderate cost from the cheaper kinds of pig-iron, the only barrier to its more general employment in shipbuilding will be removed. So far the difference in price has prevented its use for vessels in which lightness and speed are not of the first importance; if the price can be lowered and the quality maintained, there can be no doubt that it will in a few years to a large extent supersede iron.

At the Liverpool meetings more than one manufacturer pleaded for a relaxation of the tests, and complained that by the action of the various controlling bodies, such as the Admiralty, the Board of Trade, and Lloyd's, the price was kept up, and the new metal placed at a great disadvantage. It was said that Lloyd's did not trouble themselves about tests for iron, and there had really been great failures in iron as in steel. If the bending test were not so extreme, a steel could be made much cheaper than the mild steel at present used in shipbuilding, offering greater resistance to buckling, and having a tensile strength of five to ten tons more. Other speakers appeared to be of the same opinion, but in some of the remarks that were made it came out that the stronger steel would have to be much more carefully handled than the metal used at present, and especially it would be necessary to anneal it after it had been worked hot.

Dr. Siemens, on the contrary, urged that the tests should rather be increased in severity than diminished. Bad steel he considered was a very much worse material to deal with than bad iron, on account of its very treacherous character. Further, the mild steel was not improved by punching. Dr. Siemens also stated that annealing has now been given up in the Royal Dockyards; this we are not at all surprised to hear.

From remarks made by other speakers, it would appear that in their opinion the harder steel which they proposed for shipbuilding would not only require tender working and annealing, but must not be subjected to punching. For many years the punch has been a cause of offence to iron manufacturers, and yet in spite of their very frequent protests, the shipbuilder clings to it, and we may say will cling to it. We think it extremely improbable that any kind of steel will make its way in shipbuilding if it will not stand punching. We have seen specimens of mild steel cut off in narrow strips by a line of punched holes, and the metal was evidently punished very much less than iron would have been. Indeed the great feature of mild steel has been hitherto that it has suffered much less in working cold than any iron used for shipbuilding. We are inclined to think that the reduction in scantlings allowed by Lloyd's is justified, quite as much by the uniform excellence of the material, as by its greater tensile strength; the former is ensured by rigid tests and perhaps still more by being subjected to the ordinary rough treatment of the shipyard.

ERRATUM.—Page 855, *gainster* should be *ganister*.

THE SWEDISH ARCTIC EXPEDITION BY THE WAY OF THE NORTH-EAST PASSAGE.

(*Continued from page* 528.)

IN the June number of the *Nautical Magazine*, we left the *Vega*, with Nordenskiöld and his companions, off the mouth of the river Lena, where the trading steamer *Lena* departed for her destination, while the *Vega* was put on her course for the New Siberia islands. We are now enabled to give the substance of Nordenskiöld's narrative of the voyage from that date (August 27) until the *Vega* was frozen in her winter quarters; it is derived from a letter addressed by the Professor to Dr. Oscar Dickson, of Gottenburg, under date 7th January, 1879, with a postscript dated 20th February, carried by some natives to Anadyr, and thence forwarded to Stockholm.

The Professor begins with some general remarks on the coast-line of northern Asia. A glance at the map of Asia shows that the river Lena, by numerous branches, traverses a vast delta, and discharges its waters near the middle of the north coast of that continent. This delta lies nearly midway between Ugor strait on the one side and Behring strait on the other; but the stretch of coast on the two sides is of vastly different character. On the west the land trends northerly nearly as far as lat. 78° N., *i.e.*, into a latitude which, in the northern icy sea, has only been passed at a few isolated spots, and where impenetrable ice might be encountered at any time. But on the east the coast gradually trends to the southward, so that the strait by which the waters of the Pacific communicate with those of the Frozen Ocean lies southward of the Arctic Circle, and nearly on the parallel of Haparanda. On the west side the coast presents the general aspect of a woodless Tundra or rolling plain, whereas, between the Lena and Behring strait, the green woods in many places come down to the shore. It was the first time that a vessel had proceeded along the western part of the coast, much of which had not even been traversed by a boat. But more than 200 years ago a vessel sailed from the Lena to Behring straits, and though the voyage has not since been accomplished, other and shorter voyages have been made along the north-east coast of Siberia from the Lena, the Kolyma, the Yana, and the Indigirka rivers, or from Behring straits, as starting points. The coast on the west side was found to be very erroneously projected on the charts, and the *Vega* had sailed for a length of nearly 230 miles over what was laid down as land; but comparatively few errors of this kind were detected on the east coast. On the west side, the coast so far as is known, lies open to, and unprotected from, the mass of ice drifting from the Polar seas. But on the east side, the Polar sea, properly so called, is separated by the New Siberia islands and Wrangel land from the sea off the coast of the mainland; as a consequence, it was conjectured that the difficulties of the passage would be overcome on reaching the Lena. The Professor had however not forgotten that there might possibly be an obstruction eastward of the Kolyma, where the rivers are few and insignificant, and where

the warm coast current, which during the late summer renders the sea westward of the Kolyma comparatively free from ice, could not be depended on. His doubts on this head, though partly dispelled by the favourable progress of the first part of the voyage, came eventually to be justified. So far as ice is concerned, the Professor gives the following distinguishing characteristics of the voyage: between Norway and Ugor strait, no ice; between Ugor strait and the river Yenisei, but little ice; between the river Yenisei and the Bear islands (in lat. 71° N., and about 620 miles from the mouth of the Lena) scarcely any ice along the coast; eastward of the Bear islands ice, which, the further the *Vega* advanced eastwardly, became thicker and thicker, and which at last uniting with newly-formed ice finally imprisoned the vessel on the threshold of the ever open waters of the Pacific.

On parting with the *Lena*, the *Vega* was steered easterly for the New Siberia islands. A world of unexplored treasures are accumulated there—whole hills said to be composed of bones of the mammoth, rhinoceros, horse, auroch, bison, sheep, etc., and important revelations were anticipated respecting the state of the animal world which formerly inhabited Northern Asia. No strictly scientific exploration has yet been made of these islands; it was therefore desirable to land on one or more of them, or to cruise among some of them.

It was calm, but the sky mostly overcast, the thermometer at 39° Fahr., and the sea free from ice. Putting on full speed, on the afternoon of August 28th, the westernmost islands—Semenov and Strolbov—were sighted; but the sea was rapidly shoaling, and for some distance the depth did not exceed 3½ to 4 fathoms; there was also some rotten ice; these things compelled going slow, and meant delay, so that it was midday of the 30th before Liachov island was approached, and where a landing was to be effected. But the sea on the west side was covered with broken and rotten ice, and the water at fifteen miles off was only four fathoms deep. The ice was no impediment to the *Vega*, but it might be to a boat or the launch; a sudden frost had also to be thought of, or a storm, which would be dangerous for a vessel riding at anchor in a shallow open roadstead. The idea of landing was therefore,

abandoned, as the main aim of the expedition could not be jeopardised. The *Vega's* head was therefore turned southwards for the strait which separates the New Siberia islands from the mainland.

To determine the distribution of the land at the end of the Tertiary period, to obtain a better knowledge of the vertebrate animals which existed at the time of man's first appearance on the earth, to collect new evidence as to whether the progenitors of the Indian elephant could have lived in the Siberian ice-regions, to ascertain what plants and marine animals frequented the locality in former geological epochs, and to acquire a more accurate knowledge than now obtains of the general state of the Siberian ice-seas, are so many *desiderata* which call for an early solution, and Professor Nordenskiöld thinks that a small, strongly-built steamer, of light draught, like the *Lena*, would best accomplish these ends by starting from Yakutsh on a voyage of discovery and scientific observation.

The strait between the southernmost of the New Siberia islands and the main land is only about 30 miles wide. The Asiatic Continent here projects seawards in a point called Sviatoi-noss (or the Holy cape), a name probably given to it from the fact that storms and heavy ice have in former times brought to an abrupt termination many a coast voyage undertaken from the mouth of the river Lena in an easterly direction. Laptieff, in 1736, pronounced it an impossible point to round, as the Yakutsh natives told him that the ice never thawed there, but three years later (in 1739) the "impossibility" was surmounted, and he doubled the cape, as also did the Siberian merchant, Schalaurov, in 1761, when the sea was tolerably free from ice. Nordenskiöld thinks that the sea here is navigable every year, not only by steamers, but by whalers, if manned by competent and experienced seamen. He found the water in the vicinity of Sviatoi-noss but little encumbered with ice, and, with fine, clear weather, he had passed through the strait without any difficulty before midday of 31st August; the land around was also free from snow. He was now off the south point of the southern island, and thence eastward along the coast, the sea was without ice; the water was only

slightly salt, and its temperature 39° Fahr. Fine weather, with a southerly wind, lasted over 1st September, and at midday the thermometer registered 41° Fahr.; but during the night, with a northerly wind, it sank to 30°. On the next day there was a heavy fall of snow, which covered the deck, and lay thick on the Bear islands, which were reached by noon of the 3rd. The Medviesh, or Bear islands, are small and rocky, lying off the coast in front of the estuary of the Kolyma river, near latitude 71° N., long. 161° W., about 360 miles from the south point of Liachov island. This distance had been traversed in three days, being at the rate of 120 miles per day, and as the regular dredgings, soundings, observations for temperature, saltness, &c., were taken, and due caution observed in navigating unknown waters, it may be inferred that there had as yet been but little obstruction from ice. But now the ice began to show, and drifting floes appearing to northward rendered it hazardous to steam in that direction from the mouth of the Kolyma to ascertain what land or islands lay between Liachov island and Wrangel land.

From the northernmost Bear island an attempt was made to shape a course directly eastward for cape Schelag, but impenetrable ice blocked the way when 40 to 50 miles from the islands; hence the open channel along the coast had to be again sought, and this became narrower and narrower, with also a decreasing depth of water. The entrance to Tshaun bay was passed during the night of the 6th September, and cape Schelag was reached by 4 p.m.

Only two previous voyages along this coast are known, that of Deshnef in 1648, and of Schalaurov in 1760-64. Schalaurov was a wealthy Siberian merchant whose ambition was to explore the north coast of the continent, eastward of the Lena. In 1760, he started in a vessel that had been built up that river, and in the first year he got to the eastward of the Yana. He departed thence in July, 1761, weathered Sviatoi-noss (the cape of evil repute) early in September, and by the end of the month had reached the Bear islands, where ice and the lateness of the season put an end to further progress; his winter quarters were a hut built of drift wood near the mouth of the Kolyma. In the following year as soon as

the ice permitted he again started, but unfavourable winds and other mishaps did not allow of his getting further than the west side of cape Schelag, consequently he returned to his previous winter quarters with the determination of pursuing the voyage in the following summer. But the three years' cruise among the ice had wearied his men, and they refused to accompany him any further. Nothing daunted he went to Moscow for the purpose of replenishing his means, and then engaging fresh hands, he set sail again in 1764, but only to encounter the fate of Franklin; where and in what way remained a secret for 59 years, when, in 1823, one of Wrangel's companions discovered an old driftwood hut and a wrecked vessel eastward of cape Schelag; the human remains scattered about the hut indicated that here the intrepid arctic traveller and his crew had perished, probably of scurvy. It had taken Schalaurov several years to traverse the same distance which, by the aid of steam, Nordenskiöld accomplished in four or five days.

The nights now began to be so dark, and the sea so obstructed by ice that it was necessary to bring up during the night: the direct easterly course to seaward was also abandoned, and the open but shallower strip of water near the coast was sought. On approaching the land some natives were seen in their boats, but on being taken on board it was found that they could not even speak Russian. They were Tshuktus people, and an interest attaches to them inasmuch as they still partly employ stone and bone implements; living also on the highway between the Old and the New World they bear an unmistakeable resemblance to the Mongols of the Old World and the Eskimos and Indians of the New World.

From the 6th of September until the *Vega* was fast locked in the ice on the 28th, her route was confined to a narrow band of water at no great distance from the shore. She now lay to at night or was made fast to the ground ice; but her progress during the day was not such as Nordenskiöld could have wished, for her advance was stopped, now by dense fog, and now by being entangled in a labyrinth of ice through which a passage had to be forced or cut, besides which, owing to proximity to the land, the

water was shallow—barely at times more than the *Vega* drew—and hence great judgment and caution were necessarily required to avoid being frozen in and having to winter in an unsafe locality. The tardiness of the advance enabled the Professor and his companions to enter into friendly communications with the natives.

On the 8th a landing was effected at a spot where the shore consisted of a low sand ridge which separated a small lagoon from the sea; further in the land rises into barren mountain ridges. These lagoon formations appear to be characteristic of the north-east coast of Siberia, and the Tshuktus villages are generally erected on the sand ridges between the lagoon and the sea. The tents are capacious, and furnished with one or more sleeping rooms forming an inner tent lined with reindeer skins. The reception of the voyagers was at once friendly and hospitable; and the store of provisions appeared at the time to be abundant.

On the 9th and 10th no progress was made, so while the *Vega* was at anchor the voyagers took to excursions on land. The shore was sandy, and beyond high water mark there was a luxuriant growth of grass; further in a high mountain range was visible; and still further, were to be seen some snow-clad peaks. The lower land, consisting of beds of sand and clay, indicated recent elevation above the sea level, while the absence of boulders would seem to show that there are no glaciers in these regions, as is the case in Greenland. In places the hills come down towards the sea, and terminate on the coast in precipitous cliffs fifty to sixty feet high, chiefly talcose and silicious slate destitute of fossils. A single walrus, a few seals, and some birds, represented the animal world; but the holes of burrowing animals were plentiful in every direction. Intercourse with the natives was again renewed, and the similarity of these Tshuktus people to those of Greenland became more and more apparent, even to their dress, arms, utensils, habits, and customs. Gold and silver are less esteemed than tin and brass buttons, or gaudy articles of various kinds. For barter or for presents the things most in requisition are—sewing and darning needles, large knives, axes, saws, gimlets, augers, and other iron tools; linen and woollen shirts of showy colours, but also white ones; neckties; and tobacco; unfortunately they are fond of brandy, for

which they will part with anything. But they are generally shrewd and calculating in trade transactions, having been accustomed to commercial exchange from their youth. Many of the beaver skins that are sold at the fair at Irbit are from animals captured in America; they have passed from hand to hand among American and Siberian savages, and finally reach the Russian merchant. Ilir island in Behring strait is the chief mart of exchange; though there are also other and more remote places where a beaver skin will often go for a single leaf of tobacco. These natives use no salt, but all are very fond of sugar. Coffee is not liked unless sweetened to excess; but tea is eagerly drunk.

With some difficulty the *Vega* had passed beyond Irkaipi (the North cape of Cook) by the 12th, but only to be obstructed by impenetrable ice; turning back, she was brought up close to the cape, and was detained there until the 18th.

On the isthmus which connects Irkaipi with the mainland, the Tshuktus had established a village of eighteen tents. There are also at this spot some ruins—the former abodes of a people called by Wrangel the Onkilon, who were probably some centures ago extirpated by the Tshuktus, but, according to the tradition of the latter natives, driven to seek refuge among the islands far out in the polar seas. An interesting collection of the relics, arms, implements, &c., of this ancient, but now, apparently, extinct race was procured, and in their kitchen-middens were found bones of the whale, walrus, seal, reindeer, bear, dog, wolf, whiting, and birds of various kinds, together with stone and bone tools.

Near the spot where the *Vega* was at anchor there is a hill 400 feet high; looking seaward from this height the surface showed an unbroken field of ice in every direction, with merely a passage of open water near the shore; but even this appeared to be seriously blocked in many places. Up to the 18th there was no change in the ice. Nevertheless, the anchor was weighed, and the *Vega*, drawing from sixteen to seventeen feet, was steaming along the channel in three and a half to four and a half fathoms water, until, at the distance of ten or twelve miles from the last anchorage, she was forced through a belt of ice which well tested her strength; but being now in shallower water, with an ebbing tide, she was brought

up at 8 p.m. by some ground ice, and remained there until the morning. On the 19th and 20th progress continued to be very slow, as there was no favourable change in the disposition of the ice; the water was only brackish, and its temperature 32° Fahr. When the wind changed from west to north and N.W. the temperature became milder, with rainy weather, which Nordenskiöld seemed to think indicated an extent of water clear of ice lying towards the north and north-west. During the night of the 21st it rained hard, with the wind at N.N.W., and the temperature at 35·5° Fahr.; still there was no propitious break in the ice; added to which a thick fog set in. The *Vega* however was kept moving although slowly: on the 23rd a grassy plain, still free from snow was passed; inland it assumed a more hilly aspect; the shore was covered with drift wood, and many Onkilon dwellings were seen. By the 26th, cape Onman was reached; the ice now began to be thicker than any hitherto passed, but it was slightly more open, and the advance was continued on the 27th, in a sea tolerably clear. On making Kolintshin bay, its entrance was crossed and anchor cast off its north-east point a few hours before sunset. Those that landed and had ascended the heights brought back favourable accounts of the position of the ice to seaward, but unfortunately there was a dead calm all night, and the temperature fell to 28° Fahr.; the sea became covered with new ice, and the floes more firmly connected, nevertheless an endeavour was made to push on; the eastern point of Kolintshin bay was rounded, and as the depth in the coast channel was not sufficient, an attempt was made to force a way through the field-ice further out; but the night's frost had been too effective, and the *Vega* was laid along side some ground ice, in the hope that a propitious change of wind might open the few miles of water that separated her from Behring strait, especially as it was known that whalers frequently left those waters as late as the middle of October.

The hope was not destined to be realised; from the 28th of September to the date of Nordenskiöld's letter a north wind was blowing; the temperature fell to 15°, the masses of drift ice closed on the coast, and the new ice had attained a thickness of two feet. The winter quarters of the *Vega* were a mile

from the land, off the tent-village of Yintlen, three miles from the east cape of Kolintshin bay, and 115 miles from the entrance to Behring strait. When finally frozen up the water at a few miles to the eastward was still free from ice; an hour's steaming would have cleared the distance; and had the *Vega* arrived at the spot one day earlier the drift ice would have presented no obstacle to the accomplishment of the North East passage in the one season.

How the *Vega* was at last released from her ice-prison in July of this year, and then made her way through Behring strait into the Pacific, have already been briefly narrated in the October number of the *Nautical* (p. 856). The success of the main enterprise is undoubted, and the honour of having been the first to make the North-East Passage rests with Nordenskiöld and his companions. But until the Professor shall have published the record of his observations it is too early to appreciate the value, from a scientific and commercial standpoint, of this important voyage.

THE THAMES TRAFFIC COMMITTEE'S REPORT.

(*Communicated.*)

ANYONE on reading the Report of the Thames Traffic Committee, and the mass of evidence taken by it, cannot fail to be impressed by the vast amount of pains taken by each and all of the members to leave no point unsifted, and by the evidently conscientious desire to arrive at a correct and satisfactory decision; and, it seems somewhat ungracious to attempt to criticise what has been so faithfully performed.

The Committee's valuable recommendations as to the barge traffic, compulsory pilotage, police, watermen, speed of vessels, moonlight trips, &c., cannot fail to find favour with all who are not actually interested in the perpetuation of abuses, but when we come to look into the Report on the first and chief question submitted to the Committee, viz., the Rule of the Road, we find that

to a great extent it remains unanswered, or, at all events, unsettled.

This part of the Report appears to have been framed as a compromise so as to do as much as possible with as little offence as possible, and the result is a want of simplicity which will leave much in dispute and give plenty of work for the lawyers.

It is scarcely necessary to enquire what the regulations are at present, seeing that for the most part they are disregarded. Every man goes his own way, and cuts off corners at his own sweet will. Indeed, were it not for this desire to cut off corners the question of the Rule of the Road would be simplicity itself. Throughout the whole of the evidence there is a distinct ranging of forces on two sides. The one in favour of a clear channel, a defined course, and uninterrupted traffic *for all*, and the other desiring permission for each individual, by taking advantage of tides and making short cuts, to gain time for himself, at the risk of danger and delay to everyone else. It was stated that several miles would be lost if some vessels were not allowed to cut off corners between London and Gravesend. If time is to these vessels such a paramount object as to warrant their risking the safety of themselves and others, it is strange that their advocates did not make a more resolute stand against any limit being placed upon their speed.

The Committee, after recognising the shortcomings of the present practice and the necessity for alteration, appear to have studied and balanced two views only of the question.* The one a *hard-and-fast* rule *compelling* all vessels to keep on their own starboard-side of the mid-channel or fairway, thus treating the river as a

* The distinction which the Committee draw between the terms mid-channel and fairway, as if the former corresponded with mid-river, is confusing, but otherwise of no moment, as it never has been suggested that in defining the mid-channel, shoals and variations in the depth of water should not be taken into account. Mid-channel and fairway may be taken as synonymous terms, and Nos. 1 and 2 of the paragraphs described as modifications of the starboard-rule, are practically the same. Whereas, No. 3 is not a modification but a distinctly alternative rule, and Nos. 3, 4 and 5 relate only to the application of rules, whatever they may be.

narrow, enclosed channel, and the other called the port-to-port rule, compelling all vessels to port their helms when meeting so as to risk danger of collision, but allowing them to navigate the river on either or both sides, up or down, thus treating the river as a wide and open channel. This last rule is nominally in force at present. It seems to have been taken for granted that the first of these rules must of necessity be a hard-and-fast one, and a third and independent view has not been admitted to consideration, viz., whether it would not work well if the rule were established for vessels to proceed on a defined course, whilst permitting any to go out of that course at their own risk, and for their own purposes. The Committee quotes, in support of this hard-and-fast rule, a paragraph from the Report on the collision between the *Bywell Castle* and the *Princess Alice*, whereas the very next paragraph in that Report, clearly contemplates departure from anything like a hard-and-fast rule, and provides for it. It says: "It should be incumbent on vessels requiring to cross from one side of the river to the other, or to turn round, and in doing so getting out of their own water, to see that there is a clear road for them, and to keep out of the way of any vessels moving in the fairway, and as nearly all the vessels which require to make devious courses on the river are of a comparatively small size, and most handy to manœuvre, the difficulties of threading the way through crowded shipping would be thrown on those vessels most able to overcome them." It has been said that it is absurd to make a rule and at the same time permit anyone to depart from it. But what do we see daily in our street traffic? The rule is that everyone shall keep on the near or left-hand side of the road, but no one is prevented from going to the other side for his own purposes, such as to pass other vehicles or to put down passengers, &c., but he is bound to see that the road is clear before he attempts to do this, and, if in crossing over, or in driving along the right-hand or off-side of the road, he obstructs and runs foul of anything coming from the opposite direction, he is held to blame. This principle has been acknowledged by the Committee, and acted on in Sec. 27, of their proposed Steering and Sailing Rules, to the extent of steam-vessels coming from one side of the river to the other. It is to be regretted

they did not pursue the enquiry further, and consider its applicability to all steamers making courses across the fairway.

The Report states that "few do not admit numerous exceptions to this (the starboard-side) rule." Yet of all the witnesses quoted in the footnote as making objections to it (Cattarns, Towse, Keep, Pelly and Elliott), only one adduces any other reason than the loss of time or advantage to vessels wishing to cheat the tide or cut off corners, if *compelled* to keep to their own side of the fairway, and that one (Elliott, 3,267) when speaking of the necessity for vessels rounding a point to make a wide curve, speaks as if he thought the proposal was that he should keep close to the starboard-edge of the channel and not on the starboard-side of mid-channel. The Committee's own objections, which are stated in page xviii. of the Report, in paragraphs 1 and 2, only contemplate the rule as a hard-and-fast one, and would not be valid if it were not so. In paragraph 3, an objection is raised on account of the possibility of meeting sailing barges. This is met by the Committee's own proposal in the Steering and Sailing Rules, Sec. 24. In paragraph 4, the objection made by the witness Elliot is adduced, that a long steamer coming round a sharp corner is not sufficiently master of her movements to be able to keep on one side of a comparatively narrow channel, and the whole of this paragraph which, for other reasons also is well worth consideration, is intended to prove that a long steamer may, whilst rounding a point, have occasion to go somewhat out of her own water to enable her to make a sufficiently wide curve. Let us examine the value of this objection which at first sight appears a valid and reasonable one. In the River Thames, between Blackwall and Gravesend Reach, we have nine points at which the objection may be said to apply, five on the south shore (1, Margaretness; 2, Crossness; 3, Jenningtree Point; 4, Crayfordness; and 5, Broadness) and four on the north shore (1, Stoneness; 2, Cold Harbour Point; 3, Bull's Point; and 4, Hookness). They are taken in order as they would be approached by a vessel having them on her starboard-hand. Those on the south shore, when going down, and those on the north, when coming up the river.

At *Margaretness*, the fairway or channel of deepest water is, for

fully 500 yards on each side of the point, nowhere less than 100 yards wide, and the extreme difference between the courses on each side of the point at that distance is 35°.

At *Crossness*, the fairway is not less than 150 yards wide, for 600 yards on each side of the point, and the extreme difference between the courses is 20°.

At *Jenningtree Point*, the fairway is not less than 250 yards wide, for 650 yards on each side of the point, and the difference between the courses is 36°.

At *Crayfordness*, the fairway extends nearly the whole width of the river over 500 yards, and the difference between the courses at 600 yards from each side of the point is 30°.

At *Broadness*, with the fairway at only one point as narrow as 250 yards, there is a gradual sweep of 1000 yards on each side, and the extreme difference between the courses is 89°.

At *Stoneness*, the fairway is more than 500 yards wide, with a gradual sweep of 2000 yards on each side, the difference of courses not exceeding 90°.

At *Coldharbour Point*, the fairway is 250 yards wide, for 650 yards on each side of the point, and the difference of courses 70°.

At *Bull's Point*, the fairway is 150 yards wide, for 400 yards on each side, and the difference of courses 35°.

At *Hookness*, the fairway is 150 yards wide, for 750 yards on each side, and the difference of courses 35°.

The fairway is measured in the above at low water.

On looking over the foregoing statement, it is apparent that Margaretness is the most difficult turning point of the river (when the width of fairway, length of sweep or curve, and the angle required to be made, are all considered), and the one where a long ship would be most likely to require to get out of her own water in order to make a curve sufficient to straighten her down Barking Reach. This point then may be taken as representing the objection of the Committee in its gravest form. A vessel 450 feet long rounding this point against the flood would have to move on a curve for 1000 yards or 6½ times her length, and in this space would require to alter her course 35° or 3 points, having a channel 50 yards wide in which to do this without going out of her own water.

This is surely not a very sharp turn to make, even with an adverse tide on the bow. Would any of the pilots have told the Committee that when rounding this point, they found it absolutely necessary to go over to the port-side of the mid-channel? Of course, if a vessel, up to the moment of reaching the point, borrows to the starboard shore in order to keep in the slack tide as long as possible, there would then be great difficulty in getting her sharp round the corner and her head straight down the next reach against a strong flood, and one witness (Keep, 1,929) admitted with candour that it is this keeping in the slack to the last minute that creates the difficulty. We see therefore that even this objection in paragraph 4, like the ones preceding it, has its origin in the desire to save time by cheating the tide or cutting off corners.

The definition that two vessels, though in different reaches of the river, may still be meeting vessels, clears up the absurdity of the old crossing rule for river work. But in the instance mentioned in the Report, page xix., it is taken for granted that each ship sees the other. Suppose they do not, what becomes of them if they are both permitted to come rushing round a point on the same side of the channel? At his own risk no man would leave his own water, without having what is called a clear eye of the way he was going, or without being able to see everything which may be coming round on the other side of the point. Another instance is adduced of the hardship to a vessel coming up the river in shallow water on the Kent side of the deep channel, and being obliged to cross over in order to pass on the port-side of a vessel going down on the Essex side.* But suppose the vessel going down is also on the Kent side, and borrowing towards that side as much as her draught of water will allow. Is she under the port-to-port rule to port her helm and go on shore, because a vessel coming up has crossed out of her own water to cut off the corner, or to take advantage of the

* This way of stating the case is more ingenious than fair. For, if the rule is in this instance to be the hard-and-fast one, the vessel coming up would not be on the Kent side; if the rule is not hard and fast, she would not be *compelled* to cross over.

tide? And it seems as if the Committee began to feel a difficulty here, for the Report goes on at once to propose that vessels crossing from one side of the river, channel, or fairway, to the other, should keep out of the way. The difficulty will therefore be in defining what is crossing from one side to the other, whether at right angles to the shore, or from one point to the next point on the opposite shore, or to what extent between these limits.

We now come to the proposed regulation for vessels meeting at bends of the river. Everyone knows that a vessel answers her helm better when going against the tide than when going with it, and consequently this rule is more than attractive. From the readiness with which most of the witnesses approved of it, it seems to have been positively fascinating. It appears to have been overlooked, that to give a vessel going against the tide the advantage stated above, it is a main condition that the whole body of the vessel shall be in the same set of tide (such as when proceeding up or down a straight reach), and that if there is an occasion when a vessel going against the tide is at a disadvantage, it is when rounding a point, and nowhere is this made more abundantly clear than in the Committee's own Report—(page xix., paragraph 4, before referred to). Yet it is just in this position that it is proposed that a vessel shall stop and wait for the passage of another vessel meeting her. So long as a vessel is still under a point, and has not begun to feel the influence of the adverse tide on one bow only (and we may add so long probably as the other vessel has not yet been sighted over the land), there would be no harm done by stopping. But, once up to the point (and getting sight of another vessel coming up or down the next reach) then she is in a most critical position. It requires her utmost helm and speed to enable her to turn sharp, and if she then stops to a certainty she will drop broadside on to the tide at the risk of falling foul of other vessels coming up astern of her, and in her attempts to get her head straight again she will have to shear backwards and forwards, taking charge of the whole river, to the danger and obstruction of all other traffic. The proposed rule to work satisfactorily would require that vessels shall *always be able to see* everything that may be coming round on the other side of the point.

Now, if vessels as a rule kept on one side of the fairway, only departing from it when they could see what was coming and that there was no risk of danger, this rule would not be needed, for it could only apply in one case, and that for the benefit of a vessel rattling round a point in the strength of a fair tide on her wrong side of the fairway.

The proposal of the rule for the towage of barges going the whole distance beween London Bridge and the uppermost dock entrance in Blackwall Reach, will, it is to be hoped, soon render the practice universal. At any rate, until it becomes so we may depend on always having "an exceptional force of wind rendering it impracticable for any dumb barge to be kept end-on."

The suggestion that was made for universal towing between Gravesend and London has clearly been set aside as at all events premature. The difficulties of steamers and sailing vessels meeting will however be materially lessened by Sec. 24 of the proposed Steering and Sailing Rules. In fact, the mere acknowledgment that it is incumbent on a sailing craft to get out of the way of a steamer when required, will of itself do wonders in regulating the traffic.

The alterations suggested as to lights are trifling. That question has a wider range than the river, and the Committee have prudently abstained from dealing with it.

The introduction of steam-whistle signals is a new feature in the navigation of British waters. Most of the advocates of the system have the advantage of being able to speak from actual experience, and those who cannot must be content to await the issue of the experiment, and should be ready to assist in giving it a fair trial, before venturing to call in question its efficacy.

The question of the Rule of the Road for the Thames has been fought out on a distinct issue, between those anxious to cut off corners and cheat tides, and those content to keep in the fairway. As the first practice involves risk of danger, and the second ensures comparative safety, the interests of the public must coincide with the latter class. It is therefore much to be regretted that the former class has succeeded in persuading the Committee to recommend for general adoption a Rule of the Road which, whilst pro-

tecting their class interests, will practically leave the traffic of the Thames much the same as at present, *i.e.*, in confusion. The port-to-port rule is supposed to be in force now, but is admittedly unworkable.

W. P.

ANOTHER NEW AND SIMPLE DEMONSTRATION OF THE RULES FOR COMPUTING THE AMPLITUDE, AND THE TIME OF RISING OR SETTING OF A HEAVENLY BODY.

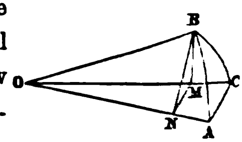
By Thomas Dobson, M.A., Head Master of the Marine School of South Shields.

THE following two general theorems require no previous knowledge beyond that of the elementary definitions of Plane Trigonometry. They are quite as useful as Napier's Rules of Circular Parts, and much less complex and embarrassing in application. In any right-angled spherical triangle, the side opposite to the right angle being called the hypothenuse, either of the two other sides may be called the perpendicular with respect to the angle opposite to that side, and the remaining side will then be termed the base; with this understanding we have—

$$\sin \text{perp} = \sin \text{hyp} \times \sin \text{angle at base} \ldots.(1)$$

$$\text{and, } \sin \text{base} = \tan \text{perp} \times \cot \text{angle at base} \ldots.(2)$$

Demon.—Let O be the centre of the sphere, A B C a right-angled spherical triangle, C the right angle; draw B M $\perp$ O C, M N $\perp$ O A, and consequently B N $\perp$ O A.



Then, by the definitions of Plane Trigonometry,

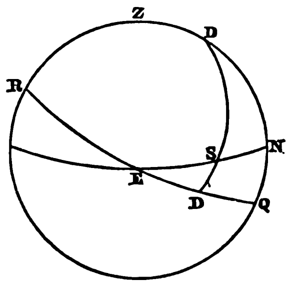
$$\sin B C = \frac{B M}{O B} = \frac{B M}{B N} \cdot \frac{B N}{O B} = \sin A \times \sin A B;$$

$$\sin A\,C = \frac{M\,N}{O\,M} = \frac{M\,N}{B\,M}\cdot\frac{B\,M}{O\,M} = \cot A \times \tan B\,C;$$

Applying these theorems to the triangle E S D in the figure;

By (1) $\sin S\,D = \sin E\,S \times \sin E$;

But E is the colatitude, and $\sin E = \cos \text{lat} = \dfrac{1}{\sec \text{lat}}$;



hence, $\sin \text{Amp} = \sin \text{Dec} \times \sec \text{Lat}$.

Again, by (2)

$$\sin E\,D = \tan S\,D \times \cot E$$

or, $-\cos R\,D = \tan \text{Dec} \times \tan \text{Lat}$.

It may be well to add here a demonstration of a third general theorem of frequent use, viz.:

$$\cos \text{hyp} = \cos \text{perp} \times \cos \text{base} \ldots\ldots (3)$$

$$\cos A\,B = \frac{O\,N}{O\,B} = \frac{O\,N}{O\,M}\cdot\frac{O\,M}{O\,B} = \cos A\,C \times \cos B\,C.$$

SHOAL PATCHES ON THE GREAT BANK OF NEWFOUNDLAND.

IN consequence of several shoal patches having been reported on the Great Bank of Newfoundland in the vicinity of Virgin rocks, an examination of the locality has been made by Staff-Commander W. F. Maxwell, Admiralty Surveyor, with the following results:—

Virgin Rocks.—The least water found on these rocks was three fathoms; shoals occupying a space six miles long and one mile broad, having depths upon them varying from five to twenty fathoms have also been found upon the bank on which the Virgin rocks are situated.

Eastern Rocks.—A shoal having a depth of nine fathoms was found to be situated East (true) from Virgin rocks distant fourteen miles.

Jesse Ryder Rock.—The position of this reported danger (in lat. 46° 29′ N., long. 49° 41′ W.) was carefully examined throughout one day, but no indication of it was found either by variation in the soundings, or change in quality of the bottom.

Bertel Bank.—The position assigned to this bank (lat. 44° 43′ N., long. 49° 52′ W.) was also carefully examined, but no sign of it was found.

Note.—The masters of various fishing vessels, who have had many years experience on the Great Bank of Newfoundland, stated that to their knowledge, no trace of shoal ground exists near the reported positions of Jesse Ryder rock and Bertel bank.

The United States Hydrographic Office has also recently published a "Sketch of the Eastern Shoals," based on information derived from the most responsible and trustworthy of the fishermen on the Great Bank. The accompanying copy of this sketch has been obligingly furnished to us by Messrs. Imray and Son, Chart Publishers, 89, Minories.

The Nine-Fathom patch, together with other spots supposed to be shoaler than the general soundings of the locality, is laid down on the sketch, which otherwise sufficiently explains itself, and will be found useful to masters navigating this part of the Atlantic. The approximate position of the Nine-Fathom patch is lat. 46° 25½′ N., long. 50° 32½′ W.

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Jesse Ryder Rock.—The position of this reported danger (in lat. 46° 29′ N., long. 49° 41′ W.) was carefully examined throughout one day, but no indication of it was found either by variation in the soundings, or change in quality of the bottom.

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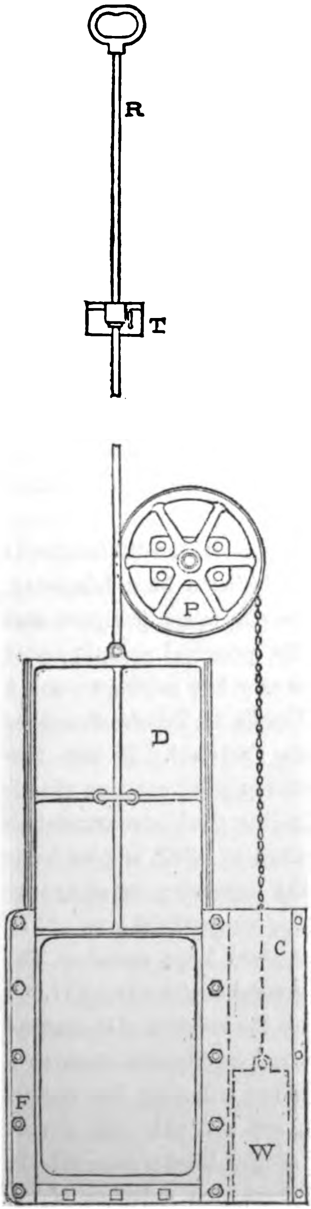
WATER-TIGHT BULKHEAD DOORS.



The sinking of so many vessels after collision, owing to the difficulty in closing the water-tight doors of compartments, has of late directed general attention to the means now in use with a view to accelerating the process, and many different arrangements, including even the use of hydraulic gear, have been brought forward. Mr. C. R. Simey, of Sunderland, has introduced a plan by which the closing apparatus is rendered entirely unnecessary, as he proposes to keep the doors always closed, except when it is necessary for any one to pass through, in which case he opens the door and closes it after he enters the next compartment. To effect this, Mr. Simey, in the most simple manner possible, balances the door in a similar manner to a window, so that no great energy is required to open or close it. In the accompanying plan D represents the door when open, W is the balance weight which is connected to the door by a chain passing over the pulley P. The door works as usual within the frame F, and can be worked from the upper if required by the rod R. If it is necessary to lock the door when shut, this can be done by tightening against the

rod the thumbscrew T. Mr. Simey's plan is based upon the reversal of the present system which is to keep the doors open until danger occurs, and it appears likely in every way to meet the present necessity of increasing the safety of ships when in danger of sinking either through striking a rock or collision.

THE PORT OF FIUME.

FIUME is a free port, the only sea-port of Hungary; it is the capital of the Littorale, and is beautifully situated on the shores of the Adriatic, at the mouth of the Fiumara, in a bay shut in by the islands Veglio and Cherso, which give it the aspect of a land-locked lake, and any merchant vessels, such as are used in the Mediterranean trade, can lie near the shore.

Notwithstanding the revival of trade at Trieste, the disadvantages under which its less-favoured rival has hitherto been labouring, are gradually being overcome, and there is every prospect that Fiume will become in course of time the principal shipping port of Hungarian produce. The town has now two railways—one a branch of the southern railway from Vienna to Trieste, the other of the Hungarian State railway from Carlstadt. It has two harbours—Port Canale Fiumara, suitable only for coasting vessels and small craft; and Porto Nuovo, affording good accommodation for shipping. The latter port, commenced in 1847, is now being much enlarged and extended, to meet the increasing requirements of trade, and when completed will occupy a superficial area of 57½ acres, and afford quay room for one hundred large vessels. The estimated cost of the works under the present contract is 6,877,000 florins; this includes 800,000 florins for the erection of the second mole and all necessary harbour fittings and appliances, such as a lighthouse, a steam tug for harbour service, a floating fire engine, a quarantine house, quay warehouses, and a double line of rails along the quays. The total length of the breakwater will be 1,069 metres, bearing from east to west, the entrance of the

harbour being from the west. The shore work comprises quay and pier accommodation 1,560 metres in length. When pier No. 1 is completed, large bonded warehouses, one for the Austro-Hungarian Lloyd's Steamship Company, will be built upon it. The entrance to the harbour is marked by a fixed shore light visible at ten miles distance, and a floating light moored to the end of the breakwater, visible at two miles distance; the entrance is between these two lights: course, south-east, after passing the floating light. These lights are of a temporary character, pending the conclusion of the works.

Vice-Consul Faber states that the trade of Fiume shows some signs of improvement worthy of notice. The total imports by sea and land in 1877 were 47,840,187 florins value, and compared with former years this presents a constant though fluctuating increase. The principal exports by sea consist of beech and pine staves, oak staves, boards and scantling, flour, bran, maize, charcoal, paper, tobacco, &c. France consumes from 35,000,000 to 40,000,000 oak staves a year, and England from 6,000,000 to 8,000,000. It is an entrepôt for sea-salt. The direct exports to Great Britain have risen from nil in 1875 to 1,240,082 florins value in 1877, and the direct imports from Great Britain from 71,685 florins in 1875, to 396,964 florins in 1877; the total value of the direct trade with Great Britain being, in 1877, 15,156 tons weight, valued at 1,637,046 florins. It may be seen that the principal countries traded with are Italy, Russia, Turkey, England, &c., in the table of imports, and England, Italy, France, Greece, &c., in the table of exports, arranged according to their importance. The trade with England is still in its infancy, but yet it already heads the list of exports, and it is confidently to be expected that the direct export trade with England will continue to increase with rapid strides. This impression is confirmed by the shipments of flour, conveyed to Liverpool and Glasgow in twelve steamers, which amounted, during the first nine months of 1878, to 64,440 sacks, equivalent to 8,055 tons weight.

The total number of vessels entered and cleared in the year 1877 was 5,441, representing 330,558 tons; the percentage of steamers to the total was, in number, 33·34, and in tonnage, 57·58.

The British shipping entered at the port had increased from 1,318 tons in 1875, to 10,918 tons in 1877, and nine months of 1878 to 19,842 tons. The British shipping was employed as follows during the year 1877:—

ENTERED.

From		No.	Tons.
Liverpool	General cargo ...	9 ...	6,430
Black Sea	Wheat	4 ...	2,915
Liverpool	Coal	1 ...	199
Fowey	China clay	1 ...	272
Richmond, U.S. ...	Tobacco	1 ...	248
Palermo	Ballast	1 ...	854
		17	10,918

CLEARED.

To		No.	Tons.
Liverpool	General cargo ...	9 ...	6,430
London	Flour	2 ...	1,368
Glasgow	Flour	2 ...	1,656
Messina	Timber	1 ...	272
Sundry Ports ...	Ballast	3 ...	1,192
		17	10,918

Besides which twelve cargoes of coal from Great Britain were entered under the Austro-Hungarian flag.

In former days, before the introduction of railways, Fiume was, owing to its position, the natural shipping port for the country lying south of the Danube, and at the beginning of this century, under Francis I., the Louissen Strasse, a beautiful trunk road, seventy-six miles long, was built across the Croatian Alps, connecting Fiume with Carlstadt, and thereby facilitating the trade with Croatia, Hungary, Slavonia, and Bosnia. At that time the trade of Fiume was very important. But under the monopoly of the Südbahn, and before the railway communication with Fiume was seriously thought of, a line was built connecting Sissek, on the Save, and Agram with Steinbrück, lying on the main line from Vienna to Trieste. By this means the whole trade, which to that time had concentrated at Fiume, was diverted to Trieste, and thus

totally disregarded, remained without any railway communication until 1873. There is, however, little doubt that either with the consent or in spite of the Südbahn, Fiume will become the chief shipping port of Hungarian produce, and more especially flour and grain, and that Trieste will lose what it has hitherto acquired by artificial means.

The soil of the surrounding country is strong, but the climate is warm, and the rosoglio wine is extensively produced. The Gulf of Quarnero yields a plentiful supply of fish, and the tunny trade with Trieste and Venice is of considerable importance. At the mouth of the gorge of the Fiumara, in a very romantic situation, stands an extensive paper manufactory, conducted by Messrs. Smith and Meynier. The mill is worked by water-power, but in summer steam has to be used; comsumption of ccals, between 5,000 to 6,000 tons; 300 to 400 hands employed. The quantity of paper turned out in 1877 was 19,982 cwts., whilst the annual consumption of rags is 1,500 tons, no other ingredient being used in the manufacture of paper. The torpedo factory of Messrs. Whitehead and Co. employs 500 hands. A manufactory of cartonnerie has been recently started by Messrs. G. Poosch and Co., on the French system; their "specialité" is everything that appertains to cigarette paper, of which a large quantity is exported to the East, and the enterprise is likely to prove highly successful. The establishment of a cotton mill by English capital is spoken of. The shipwrights' yards turned out in 1875-77, twenty-five vessels; tonnage, 9,823; valued at 1,318,272 florins, and the number employed in the latter year was 338 hands. In addition to the Municipal Savings Bank, the National Bank has a branch here, and the results cannot be described as otherwise than satisfactory.

A favourite excursion from Fiume is to the valley of Dragha. Another excursion may be made by water to the small port of Martinezza, about two miles from Fiume, where the Austrian revenue cruisers generally lie. The lazaretto is at the extremity of the port. Four miles further to the south lies Porto Re, the port at which Napoleon intended to create a vast arsenal belonging to the Kingdom of Illyria.

WEATHER FORECAST FOR NOVEMBER, 1879.

THE CURRENTS OR TENDENCY OF THE AIR OVER THE BRITISH ISLANDS FOR THE MONTH OF NOVEMBER, 1879.

Date.	Primary Tendency from	Force from		General Direction from	Secondary Tendency from	General Direction from	Probable Prevailing Tendency from	Probable Winds.	
								Strong veering.	Light backing.
		N. or S.	E. or W.					Prevailing	Occasional
Nov.									
1	5 h.m.	5	8½	W.S.W.	5 h.a.	E.N.E.	E.N.E.	N.N.W.	E.N.E.
2	5 m.	3	10	,,	7 a.	,,	,,	,,	,,
3	9 m.	0	12½	W.	5 a.	E.	E.	N.	E.
4	9 m.	2	11	W.N.W.	7 a.	E.S.E.	E.S.E.	N.N.E.	E.S.E.
5	8 m.	4½	9	,,	8 a.	,,	,,	,,	,,
6	8 m. †	7	7	N.W.	10 a.	S.E.	S.E.	N.E.	S.E.
7	8 m.	9	6	,,	...	...	,,	,,	,,
8	8 m.	10½	5	N.N.W.	0 m.	S.E.	S.S.E.	E.N.E.	S.S.E.
9	8 m. *	11½	4	N.N.E.	1 m.	S.S.E.	N.N.E.	W.N.W.	N.N.E.
10	8 m. †	12½	4	,,	2 m.	S.S.W.	,,	,,	,,
11	9 m.	12½	4	,,	4 m.	,,	,,	,,	,,
12	10 m.	12	5½	,,	5 m.	,,	,,	,,	,,
13	Noon *	10	8	N.E.	5 m.	,,	S.W.	S.E.	S.W.
14	3 a.	7	10½	,,	6 m.	S.W.	,,	,,	,,
15	5 a.	3½	13	E.N.E.	6 m.	,,	,,	,,	,,
16	5 a.	1	14	E. by S.	6 m.	W.S.W.	W.S.W.	S.S.E.	W.S.W.
17	7 a.	4½	11	E.S.E.	8 m.	W. by N.	E.S.E.	N.N.E.	E.S.E.
18	9 a. †	7½	8	S.E.	8 m.	W.N.W.	S.E.	N.E.	S.E.
19	11 a.	9½	6	,,	7 m.	N.W.	,,	,,	,,
20	...	...	...	...	7 m.	,,	S.S.E.	E.N.E.	S.S.E.
21	0 m. *	10½	4½	S.S.E.	7 m.	N.N.W.	N.N.E.	W.N.W.	N.N.E.
22	1 m. †	11	3½	S.S.W.	8 m.	N.N.E.	,,	,,	,,
23	2 m.	11	3	,,	8 m.	,,	,,	,,	,,
24	2 m.	10½	4	,,	9 m.	,,	,,	,,	,,
25	3 m.	10	4	,,	10 m.	,,	,,	,,	,,
26	3 m.	9	5	S.W.	11 m.	N.E.	N.E.	N.W.	N.E.
27	3 m. *	7½	6½	,,	1 a.	,,	,,	,,	,,
28	3 m.	5½	8	W.S.W	3 a.	E.N.E.	E.N.E.	N.N.W.	E.N.E.
29	3 m.	3½	10	,,	5 a.	,,	,,	,,	,,
30	7 m.	0	12½	W.	3 a.	E.	E.	N.	E.

NOTE.—General direction of Tendencies due to Sun from N.E. Daily change about 2 a., and from S.W. about 4 m. Prevailing tendency from the N.E., giving wind chiefly from N.W. to N.E. Depressions probably travelling across British Islands from N.W. to S.E.

* Retrograde movements begin. † Expansive movements begin.

(1.)	Moon's maximum	S. declination	on the	15th	=	25° 23′	decreased	10′
(2.)	„	„	N.	„	„	29th	=	25° 20′	„	6′

(1.) Will probably be felt from the 13th to the 17th.

(2.) „ „ „ 27th „ Dec. 3rd.

REMARKS.

1. Principal transition periods, 9th and 21st, when the tendencies change from S.S.E. and N.N.W. to N.N.E. and S.S.W.

2. The retrograde movements during the month will probably be rising motions from the north, and the expansive falling from the south, hence expansive movements more likely to give rise to gales.

3. As we are now in the sun's easterly tendency, the stormy periods will likely be during the moon's primary westerly, or from the 1st to the 9th and 21st to 30th.

4. As may be observed, I have attempted indicating the probable prevailing tendencies with the consequent winds, but too much reliance must not be placed upon this part of the table. The primary and secondary tendencies are always both acting, but usually one of them prevails, the prevailing tendency determining the winds. When they are nearly equal, a cyclone or anti-cyclone results. The winds on opposite sides of well-developed cyclones or anti-cyclones are the same as the tendencies; thus a cyclone occurring during tendencies from the N.W. and S.E., would have N.W. winds on its southern side and S.E. on its northern. On the other hand, an anti-cyclone during similar tendencies would have the N.W. winds on its northern side and the S.E. on its southern. Our best developed cyclones come, I think, from some point between W. and N. during strong S.Ely. tendency, and anti-cyclones from some point between S. and W. during strong N.Ely. tendency. The probable prevailing winds given in the Forecast, do not refer to these extreme cases, but to the ordinary conditions.

5. The force from the north has slightly decreased, and the rotatory velocity increased since last month.

6. The change from the sun's westerly to easterly tendency, occurring about the 31st ult., was inadvertently stated as the sun's second great retrograde movement. On the contrary, this retrograde movement occurs about the 20th of this month.

7. The winds and changes of wind due to prevailing tendencies are exhibited in the following table:—

Prevailing tendency.	Winds.	Prevailing tendency.	Wind.
S.W.	*S.E. veers to S.W. S.W. backs „ S.E.	N.E.	N.W. veers to N.E. †N.E. backs „ N.W.
S.E.	N.E. veers to S.E. † S.E. backs „ N.E.	N.W.	*S.W. veers to N.W. N.W. backs „ S.W.
S.S.W.	*E.S.E. veers to S.S.W. S.S.W. backs „ E.S.E.	N.N.E.	W.N.W. veers to N.N.E. †N.N.E. backs „ W.N.W.
S.S.E.	E.N.E. veers to S.S.E. †S.S.E. backs „ E.N.E.	N.N.W.	*W.S.W. veers to N.N.W. N.N.W. backs „ W.S.W.
W.S.W.	*S.S.E. veers to W.S.W. W.S.W. backs „ S.S.E.	E.N.E.	N.N.W. veers to E.N.E. †E.N.E. backs „ N.N.W.
E.S.E	N.N.E. veers to E.S.E. †E.S.E. backs „ N.N.E.	W.N.W.	*S.S.W. veers to W.N.W. W.N.W. backs „ S.S.W.

* Wind and change on south side of a well marked cyclone.

† „ „ north „ „ „

BOOKS RECEIVED.

The Bijou Gazetteer of the World. By W. H. Rosser. London: F. Warne and Co. 1876.

This little work contains 30,000 references to places, describing the position, area, population, &c., of each. It has been out some years, but nevertheless, having recently found its value we desire to call our readers' attention to the existence of a compact, handy, cheap and accurate gazetteer, and to recommend them to purchase a copy.

The Naval Architect's and Shipbuilder's Pocket-Book. By Clement Mackrow, A.I.N.A. London: Crosby Lockwood and Co. 1879.

In these days of advanced knowledge a work like this is of the greatest value. Not only do Naval Architects and Shipbuilders continually require a work of reference containing the ordinary formulæ, rules and tables for working out calculations concerning ships and their equipments, but owners, masters, and many other persons professionally connected with shipbuilding, are constantly in want of a handy book to which they can refer to explain technicalities with which they have an imperfect acquaintance In this little volume a vast amount of information is collected together in a compact and convenient form, and with the aid of the copious index there is no difficulty in at once finding anything

required. In looking over the work it has occurred to us that some fuller information concerning the positions and characters of side-lights, and also some more details as to the shapes and fitment of screw-propellers might be desirable. We hope Mr. Mackrow will have an opportunity of enlarging on these matters in another edition.

As regards the exterior of the book, we think it is most appropriate and convenient, especially do we approve of the useful india-rubber band which effectually provides for the retention of loose papers. This, combined with the convenient size of the volume, makes it admirably adapted for what it claims to be, viz., a pocket-book.

Notes on the Isthmus of Panama and of Darien, also on the River St. Juan, Lakes of Nicaragua, &c., with reference to a Railroad and Canal for joining the Atlantic and Pacific Oceans. By Captain George Peacock, F.R.G.S. Exeter: W. Pollard, North Street. 1879.

Captain Peacock justly claims to be one of the earliest pioneers of the great enterprise for connecting the two oceans by a railroad and canal across the Isthmus of Panama. In the interesting little volume now before us, he mentions that between 1831 and 1842 he crossed the Isthmus five times, and gives a good deal of practical information concerning the locality in question. As far back as 1832 it appears that Captain Peacock proposed the route from Navy Bay to the Estuary of the Rio Grande, and this is the route which seems to have found most general favour with the promoters of the scheme which has recently been before the public.

Captain Peacock devotes a considerable portion of his work to the services in which, as an officer in the Royal Navy, he has been employed in connection with exploring and surveying expeditions. In regard to these services which were undoubtedly of a most useful character, Captain Peacock publishes many flattering testimonials from officers of the highest distinction, and it is evident that he feels somewhat keenly the fact that these services have not met with any official recognition in the shape of some honorary reward. But Captain Peacock may congratulate himself, that among nautical men he is well known as an indefatigable worker in the cause of geographical exploration, and that if he is not publicly honoured, his name will long be remembered in the profession in which he has done such good service.

SHIPBUILDING, 1879.

Sailing Ships.

Ports.	No. of Ships first six months.	No. of Ships added July, Aug., Sep.	Gross Tonnage first six months.	Gross Tonnage added July, Aug., Sep.
Aberdeen ...	1	—	1,176	—
Banff ...	1	1	177	164
Barrow ...	4	1	414	129
Belfast ...	2	1	257	299
Bristol ...	2	—	139	—
Cowes ...	2	—	91	—
Dartmouth ...	19	5	1,013	254
Dundee ...	1	—	1,272	—
Faversham	13	5	543	217
Glasgow ...	8	2	9,320	1,791
Greenock ...	3	1	94	25
Grimsby ...	11	5	728	383
Hull ...	6	3	394	222
Jersey ...	4	2	242	74
Liverpool ...	1	8	89	836
London ...	23	6	1,104	273
Lowestoft ...	5	3	139	90
Middlesbro'	1	—	770	—
Plymouth ...	7	3	265	352
Port Glasgow	4	3	5,349	2,261
Portsmouth	3	—	408	—
Rochester ...	10	2	437	109
Rye ...	9	5	394	205
Southampton	4	—	78	—
Sunderland	3	1	2,632	1,083
Whitehaven	1	—	1,403	—
Workington	1	1	1,068	1,145
Yarmouth	13	4	671	122
Other Ports	62	26	4,794	1,821
Total Sailing	224	88	35,461	11,855

SHIPBUILDING, 1879.

Steamships.

Ports.	No. of Ships first six months.	No. of Ships added July, Aug., Sep.	Gross Tonnage first six months.	Gross Tonnage added July, Aug., Sep.
Glasgow ...	49 ...	18 ...	58,996 ...	25,083
Greenock ...	11 ...	2 ...	7,882 ...	3,504
Port Glasgow	11 ...	4 ...	7,794 ...	2,648
Sunderland	34 ...	15 ...	52,915 ...	19,181
Newcastle ...	49 ...	21 ...	60,497 ...	32,831
North Shields	4 ...	1 ...	3,528 ...	18
South Shields	8 ...	7 ...	6,056 ...	3,018
Liverpool ...	8 ...	2 ...	11,540 ...	6,446
Dundee ...	7 ...	4 ...	5,983 ...	3,549
Hartlepool ...	13 ...	6 ...	13,740 ...	9,290
Aberdeen ...	2 ...	1 ...	1,373 ...	170
London ...	11 ...	5 ...	1,359 ...	4,075
Belfast ...	5 ...	2 ...	7,818 ...	3,667
Stockton ...	9 ...	6 ...	12,558 ...	6,689
Middlesbro'	5 ...	3 ...	3,699 ...	3,063
Hull ...	1 ...	1 ...	1,701 ...	2,351
Barrow ...	2 ...	— ...	7,381 ...	—
Whitby ...	3 ...	2 ...	4,821 ...	3,319
Southampton	2 ...	3 ...	1,895 ...	2,568
Whitehaven	2 ...	1 ...	1,478 ...	1,357
Leith ...	3 ...	2 ...	250 ...	92
Other Ports	21 ...	3 ...	3,788 ...	796
Total Steam	260 ...	109 ...	282,052 ...	133,715
Total Sailing	224 ...	88 ...	35,461 ...	11,855
Grand Total Steam & Sail during the nine months	484	197	317,513	145,570

		No.		Tons (Gross.)
1879. *Steam*, total during the nine months		369	...	415,767
1878. *Do.* ,, corresponding period		394	...	362,245
Increase in tonnage during the nine months			...	53,522

TIDE TABLES FOR NOVEMBER, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	2 52	3 7	7 22	7 38	4 12	4 29	3 8	3 24	6 27	6 41	—	0 6
S	2	3 23	3 39	7 54	8 10	4 46	5 3	3 41	3 58	6 55	7 9	0 23	0 41
M	3	3 55	4 12	8 26	8 43	5 20	5 38	4 15	4 32	7 25	7 41	1 0	1 19
Tu	4	4 28	4 46	9 2	9 21	5 57	6 17	4 51	5 12	7 57	8 13	1 38	1 57
W	5	5 4	5 24	9 41	10 8	6 38	7 1	5 34	5 58	8 31	8 52	2 17	2 38
Th	6	5 47	6 12	10 30	11 1	7 29	7 58	6 24	6 54	9 15	9 42	3 0	3 25
F	7	6 40	7 10	11 37	—	8 33	9 11	7 28	8 4	10 15	10 50	3 53	4 22
S	8	7 43	8 20	0 13	0 49	9 50	10 28	8 43	9 22	11 30	—	4 54	5 28
S	9	9 0	9 40	1 25	1 59	11 4	11 38	9 58	10 32	0 11	0 50	6 2	6 37
M	10	10 14	10 45	2 32	3 1	—	0 7	11 0	11 25	1 29	2 4	7 9	7 38
Tu	11	11 15	11 43	3 28	3 54	0 32	0 56	11 49	—	2 34	3 1	8 6	8 31
W	12	—	0 8	4 19	4 42	1 18	1 40	0 12	0 35	3 27	3 53	8 56	9 21
Th	13	0 32	0 54	5 5	5 28	2 2	2 24	0 58	1 21	4 19	4 44	9 46	10 12
F	14	1 17	1 40	5 51	6 16	2 46	3 9	1 44	2 7	5 9	5 33	10 38	11 4
S	15	2 4	2 29	6 41	7 6	3 33	3 58	2 30	2 53	5 57	6 21	11 31	11 59
S	16	2 58	3 17	7 31	7 56	4 23	4 48	3 18	3 43	6 45	7 9	—	0 26
M	17	3 42	4 6	8 21	8 46	5 13	5 39	4 8	4 34	7 33	7 57	0 53	1 20
Tu	18	4 31	4 56	9 11	9 37	6 6	6 33	5 1	5 29	8 21	8 43	1 47	2 13
W	19	5 21	5 47	10 3	10 32	7 0	7 30	5 57	6 26	9 6	9 32	2 39	3 5
Th	20	6 16	6 45	11 5	11 39	8 2	8 35	6 57	7 30	9 59	10 29	3 31	3 58
F	21	7 15	7 45	—	0 15	9 12	9 49	8 5	8 41	11 0	11 32	4 25	4 58
S	22	8 18	8 54	0 48	1 20	10 23	10 56	9 18	9 50	—	0 7	5 23	5 53
S	23	9 30	10 4	1 51	2 21	11 28	11 57	10 21	10 50	0 42	1 16	6 25	6 57
M	24	10 36	11 7	2 50	3 19	—	0 24	11 17	11 43	1 47	2 17	7 29	7 57
Tu	25	11 36	—	3 46	4 11	0 49	1 12	—	0 6	2 44	3 10	8 23	8 46
W	26	0 1	0 23	4 33	4 53	1 32	1 52	0 26	0 46	3 33	3 56	9 8	9 30
Th	27	0 44	1 4	5 12	5 31	2 11	2 20	1 6	1 25	4 17	4 37	9 50	10 10
F	28	1 23	1 42	5 50	6 9	2 47	3 4	1 41	2 2	4 56	5 14	10 30	10 50
S	29	2 0	2 16	6 27	6 44	3 21	3 37	2 10	2 35	5 32	5 50	11 9	11 28
S	30	2 33	2 50	7 2	7 20	3 54	4 11	2 51	3 7	6 7	6 24	11 47	—

Week Day.	Month Day.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown A.M.	Queenstown P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	7 43	7 59	—	0 10	0 42	0 59	5 51	6 7	11 58	—	8 45	9 0	4 33	4 48
S	2	8 14	8 29	0 26	0 42	1 15	1 31	6 24	6 41	0 15	0 32	9 15	9 30	5 4	5 20
M	3	8 45	9 1	0 58	1 14	1 47	2 4	6 58	7 15	0 49	1 7	9 46	10 5	5 38	5 56
Tu	4	9 17	9 33	1 32	1 51	2 22	2 40	7 33	7 51	1 26	1 46	10 24	10 48	6 15	6 35
W	5	9 50	10 10	2 10	2 31	2 59	3 20	8 10	8 33	2 7	2 30	11 16	11 49	6 57	7 21
Th	6	10 32	10 59	2 54	3 21	3 43	4 9	8 57	9 24	2 56	3 24	—	0 24	7 47	8 17
F	7	11 30	—	3 53	4 28	4 38	5 10	9 54	10 30	3 58	4 34	1 5	1 48	8 50	9 26
S	8	0 5	0 42	5 7	5 49	5 45	6 23	11 8	11 46	5 10	5 46	2 27	3 5	10 6	10 45
S	9	1 20	1 57	6 29	7 5	7 0	7 36	—	0 22	6 20	6 53	3 37	4 7	11 23	11 56
M	10	2 30	3 8	7 36	8 8	8 8	8 37	0 54	1 25	7 21	7 48	4 31	4 50	—	0 24
Tu	11	3 35	4 5	8 28	8 52	9 4	9 29	1 55	2 21	8 15	8 42	5 12	5 32	0 51	1 16
W	12	4 33	5 1	9 14	9 36	9 54	10 19	2 47	3 12	9 7	9 31	5 54	6 17	1 39	2 2
Th	13	5 28	5 55	9 59	10 23	10 44	11 9	3 37	4 2	9 53	10 16	6 42	7 6	2 25	2 48
F	14	6 22	6 47	10 48	11 13	11 34	mid.	4 28	4 53	10 38	11 1	7 32	7 58	3 11	3 35
S	15	7 12	7 37	11 38	—	—	0 26	5 18	5 43	11 25	11 51	8 16	8 39	4 0	4 25
S	16	8 1	8 24	0 8	0 28	0 52	1 17	6 8	6 33	—	0 17	9 2	9 25	4 50	5 15
M	17	8 47	9 10	0 53	1 18	1 42	2 7	6 58	7 23	0 43	1 9	9 47	10 15	5 40	6 6
Tu	18	9 33	9 54	1 43	2 8	2 32	2 56	7 48	8 12	1 36	2 3	10 40	11 12	6 32	6 58
W	19	10 15	10 38	2 33	2 58	3 21	3 47	8 37	9 2	2 30	2 58	11 47	—	7 25	7 52
Th	20	11 3	11 33	3 25	3 56	4 14	4 42	9 28	9 57	3 28	4 0	0 26	1 5	8 21	8 52
F	21	—	0 4	4 30	5 6	5 13	5 45	10 29	11 8	4 36	5 9	1 48	2 26	9 35	10 1
S	22	0 37	1 11	5 43	6 20	6 18	6 51	11 37	—	5 41	6 11	3 0	3 36	10 36	11 11
S	23	1 45	2 18	6 54	7 25	7 24	7 56	0 10	0 42	6 41	7 11	3 58	4 28	11 44	—
M	24	2 50	3 22	7 55	8 21	8 26	8 54	1 14	1 44	7 39	8 6	4 46	5 7	0 14	0 41
Tu	25	3 52	4 10	8 45	9 6	9 20	9 43	2 12	2 36	8 32	8 56	5 27	5 46	1 6	1 30
W	26	4 45	5 10	9 26	9 47	10 6	10 27	2 59	3 20	9 10	9 41	6 6	6 27	1 51	2 10
Th	27	5 31	5 53	10 4	10 22	10 47	11 7	3 41	4 0	9 58	10 15	6 46	7 5	2 29	2 48
F	28	6 12	6 32	10 40	10 58	11 27	11 46	4 10	4 38	10 33	10 49	7 23	7 43	3 7	3 25
S	29	6 51	7 9	11 16	11 34	—	0 4	4 50	5 14	11 6	11 24	7 58	8 14	3 42	3 59
S	30	7 26	7 40	11 52	—	0 22	0 40	5 33	5 50	11 39	11 57	8 30	8 46	4 16	4 33

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 8	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 28	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 28	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 8	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 8	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 37	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 36	Brest
Gravesend	−0 43	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 58	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 8	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+C 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 18	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 23	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 48	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

3709. Eugene A. Heath, New York City, U.S.A. "Improvements in screw-propellers." (A communication; complete specification.)

3761. John Thomas Rowe, Plymouth. "An improved composition for coating ships' bottoms, floating, and other structures."

3778. Philip Arbogast and Thomas Joseph McTighe, both of Pittsburg, Pennsylvania, U.S.A. "Improvements in the manufacture of metal rods or wire with a vitreous coating, chiefly designed for telegraphic cables, and in devices for aligning and coupling such cables." (A communication; complete specification.)

3779. William Augustus Leggo, Quebec, Canada. "Improvements in imparting to vessels immersed in air or water progressive or retrogressive motion, and in the apparatus used therefor." (A communication.)

3795. Thomas Silver, Dumbarton Road, Glasgow. "An improved method of and apparatus for maintaining ships' berths, and other articles in ships, in a level position."

3806. George T. F. Edwards, South Shields, Durham. "Improvements in compositions for protecting or preserving ships' bottoms and other submerged surfaces, also applicable to stone and other building materials."

3807. John Langton and Louis Silverman, Cheapside, London. "A new or improved apparatus to be used for signalling on railways during fogs and at other times."

3887. Edward Jacob Hill and Josiah Latimer Clark, London. "Improvements in apparatus for suspending and detaching boats and other objects."

3909. Francis Blakeman Hammond, Folkestone, Kent. "Improvements in apparatus to be used in lowering boats from the side of vessels."

4004. Anselm Heel, Bielefeld, Westphalia, Germany. "Improvements in propelling ships or vessels, and in the apparatus, or means employed therein." (A communication.)

4008. John Evelyn Liardet, Brockley, Kent. "A new or improved double grip anchor."

4040. Robert Waddell and Daniel Taylor, both of Liverpool. "Improvements in governors or appliances for controlling the speed of engines in steam propelled ships."

4080. Robert Baird Lindsay, Glasgow. "Improvements in ashes lifters for steam ships."

4082. Thomas I. Jones and Edward Bull, both of London. "Greatly increasing the speed of working submarine cables and underground wires or telegraphic lines."

4111. Anton Graf and Julius Patschke, both of London. "Improvements in diving and swimming apparatus."

4130. Henry Flowers, Halifax, Nova Scotia. "Improvements in reefing sails." (A communication.)

4137. Henry Albert Fleuss, London. "Improved means for enabling persons to remain under water or in vitiated air, applicable to the helmets and dresses worn by divers and others, and to diving bells, submarine boats, and such like."

AMERICAN.

217379. Thomas N. Howell, Circleville, Ohio. "Grave torpedoes."

217928. John Cunningham, Paducah, Ky. "Construction of steamboats."

218193. James H. Preater, Brooklyn, N.Y. "Shipping drums."

218438. Eugene A. Heath, New York, N.Y. "Screw-propellers."

218448. Louis L. Lyon, Bridgeport, Conn. A combined ships' pump and windlass."

PATENTS PUBLISHED.

MARINE ENGINE TELEGRAPHIC APPARATUS.

652. John Shaw, Neptune Engine Works, Northumberland. This consists in connecting the reply mechanism of the usual kind of telegraphic apparatus, for transmitting orders from the bridge of

a steamer to the engine-room, to the way shaft or valve motion lever, so that when the engineer executes an order the consequent adjustment of the valve gear will automatically cause the transmission of a signal to the dial on the bridge. According to another modification, the main shaft of the engines is connected by gearing or by cords to the spindle of a small crank, which is fitted in immediate connection with the telegraphic transmitting mechanism on the bridge. This indicating crank shows at all times, when in gear, exactly what the engines are doing.

MARINERS' COMPASSES.

679. Sir William Thomson, Knight, Glasgow College. The object of this invention is to obtain greater steadiness of the card in steamers which have powerful engines, and consequently much vibration. The usual method is to suspend the bowl by indiarubber bands, but the objection to this is that the indiarubber becomes rotten in warm climates, or when exposed to oil. According to this invention, the gimbal ring is hung from an elastic ring of brass wire, supported by two balls resting in two sockets attached to the brass rim of the binnacle, for correcting the variation in the ship's sub-permanent magnetism, and that induced by the vertical component of the earth's magnetic force. Two sets of magnets are used, one set placed fore-and-aft for counteracting the fore-and-aft component of the ship's magnetism, and the other set thwartship for counteracting the thwartship component. These magnets consist of a number of magnetised steel rods and are held under the compass in holes bored to receive them.

SCREW-PROPELLERS.

850/79. James Skinner, South Shields. This consists first, in so forming the propeller blades that a circumferential section at any part is convex on the after or propelling face in place of being straight. As the convexity of the after face is increased, the convexity of the opposite face is reduced until they become equal or nearly so to each other; the result of this is that the pitch of the propelling face is greatest at the forward edge and less at the after edge, and the edge resistance is greatly diminished and the efficiency of the propeller increased. Secondly, in so forming the

leading edge that they are sharpened partly from the after face as well as from the forward face. Thirdly, in forming upon the after face ribs which prevent the water acted on by the propeller acquiring a centrifugal motion.

PROPELLING VESSELS.

977/79. Alexander Morton, Glasgow. According to this invention the screw-propeller is surrounded concentrically by a conical casing riveted to the stern of the vessel by stringers or brackets, and so arranged that its larger end is ahead of the contained screw-propeller, whilst the narrow end extends just so far aft as to deliver the current of water set in motion by the screw-propeller in a straight line astern. The result of employing this arrangement is not only to increase the thrust from the screw, but also to create an extra thrust upon the vessel itself.

STEERING APPARATUS.

994/79. George Guthrie, Sunderland, Durham. The object of this invention is to reduce the shock or strain put upon the working parts of a vessel's steering apparatus, when a heavy sea strikes the rudder, and consists in bringing up the rudder-post to about the height of the centre of the steering wheel, and fitting it with a horizontal worm wheel. This worm wheel is actuated by two worms placed parallel to each other, the worm wheel being between. The axle of each is supported in the frame of the apparatus and is capable of moving horizontally. Each end of the bearings of the shaft butt against elastic cushions, or springs, so that should the worm wheel receive the shock of a heavy sea striking the rudder, the two worm shafts would receive motion therefrom and gradually come to rest by the action of the elastic cushions.

SIGNALLING BY MEANS OF LIGHTS ON BOARD SHIPS.

2268/79. Carl O. Ramstedt, Finland, Russia. This consists in providing a trough or cup in which is placed a combustible material, which when burning gives out a bright light. By the aid of a powerful reflector this light is thrown on the steam issuing from the ship's funnel, and is visible at a much greater distance than ordinary signal lights.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
806	England—East Coast—Yarmouth and Lowestoft	Alterations in buoyage.
807	" " Humber River	Extension of Hull Middle Sand.
808	" " Warkworth Harbour	Alterations of tidal-light.
809	North Sea—Netherlands—Hook of Holland Canal	Automatic signal-buoy off entrance.
810	" " Egmond-aan-Zee	Lights re-exhibited.
811	" Ems River—Delfzyl	Alteration in position of harbour light.
812	" Elbe River—Schulau Light-vessels	Changes owing to formation of New Channel.
813	Norway—Skagerrak—Store-Gronnengen	New light.
814	" " Kjeholmen	New light.
815	Sweden " Waderobod	Fog-signal discontinued.
816	Baltic Entrance—Sound—Flint Channel	Various lights and alterations.
817	Baltic—Sweden—Carlskrona	Alteration in lights.
818	" " Sundswall—Draghall Rock	Permanent light shown.
819	" " Pitea—Lilla Leskar	New light.
820	France—North Coast—Vergoyer Bank	New buoy.
821	" " Grisnez	Automatic signal-buoy.
822	" " Portrieux	Intended alteration in position of harbour light.
823	" West Coast—Gironde River	Increased visibility of Patiras light.
824	Mediterranean—France—Hérault River	Marks to distinguish light-towers.
825	" Corsica—Macinaggio	Proposed harbour light.
826	" Algeria — Habibas Island	New light.
827	" Malta—Marsamuscetto Harbour	New harbour light.
828	" Cyprus—Famagousta	Position of danger near fairway.
829	Adriatic—Italy—Port Bari	New harbour light and alterations.
830	" Cazza Islet—Gradisca Point	Permanent light established.
831	Black Sea—Odessa—Quarantine Mole	New lights on Mole Head.
832	Africa—West Coast—Congo River	Directions for Banana Creek.
833	" " St. Paul de Loando	New lights and time ball.
834	India—Bay of Bengal—Madras Road	Extension of harbour works.
835	" " False Point Anchorage	Alteration in signals at False Point.
836	Cochin China—Pulo Canton	Sunken danger.
837	Eastern Archipelago—Sourabaya Strait	Alteration in position of light-vessel.
838	" Sulu Sea—Sulu Road	New light.
839	Australia—North West Coast	Dangerous rocks reported.

No.	PLACE.	SUBJECT.
840	SOUTH AUSTRALIA—Port Adelaide	Exhibition of gas lights postponed.
841	„ „ River Murray	Light discontinued.
842	AUSTRALIA—South Coast—Port Phillip	Shoal in South Channel.
843	„ East Coast—Kiama Harbour	New light.
844	„ „ Port Macquarie —Tacking Point	New light.
845	„ „ Cumberland Islands	Reported reef.
846	UNITED STATES—Pacific Coast—Washington Territory—Puget Sound	New light on Point Wilson.
847	„ North Carolina—Cape Fear River—Federal Point	Light to be discontinued.
848	„ Delaware Bay — Five Fathom Bank	Light-vessel replaced with fog-signal.
849	„ Long Island Sound — Falkner Island	New fog-signal at lighthouse.
850	„ Rhode Island—Newport	Colour of Lime Rock light changed.
851	„ Massachusetts—Boston	Rock in Main Ship Channel.
852	CANADA—Bay of Fundy—Pease Island	New lights.
853	„ Nova Scotia — Whitehaven—Three Top Island	New light.
854	GULF OF ST. LAWRENCE—Chaleur Bay—Ristigouche River	Various new leading lights.

NAUTICAL NOTICES.

306.—ENGLAND.—EAST COAST.—*Yarmouth and Lowestoft.—Alterations in Buoyage.*—With reference to Notice 273, p. 897, the following alterations and additions have been made, viz. :—

S.W. Barnard Buoy has been moved 1 Cable S.W., and now lies in 15 feet, with—Kessingland lighthouse cottage, open eastward of Covehithe lifeboat house, N. by E. ¾ E.; Covehithe church, in line with the coastguard hut on Covehitheness, W. by N. ¾ N.; Inner Barnard buoy, South, Wly., distant 3½ cables.

Covehithe Buoy has been moved 2 cables S.S.W., and now lies in 3½ fathoms, with—Lowestoft and Kirkley high mills in line, N.N.E., Ely.; West Barnard buoy, N.N.E. ¾ E., distant 8 cables; S.W. Barnard buoy, S.W. ½ S., distant 6 cables.

East Newcome Buoy has been moved 7 cables N.E. ¼ N., and now lies in 7 fathoms, with—Lowestoft mill one-third from a tall chimney towards Lowestoft coastguard flagstaff, N.N.W.; Pakefield church tower, its length northward of Pakefield mill, W. by N. ¼ N.; S.E. Newcome buoy, S.W. ¾ S., distant 2 miles.

South Holm Buoy has been moved 8½ cables N.E. ¼ N., and now lies in 6½ fathoms, with—Corton church in line with the east side of the lifeboat house, N. ¾ W.; Pakefield church tower, its length southward of Pakefield mill, W. ½ N.; East Newcome buoy, S.W. ⅛ S., distant 3¼ cables.

S.W. Holm Buoy has been moved 9 cables N.E. ¼ N., and now lies in 5½ fathoms, with—Corton church, in line with the lifeboat house, N. ¾ W.; Pakefield church, just open southward of the lifeboat house, W. ½ S.; South Holm buoy, S. ¾ E., distant 3 cables.

N.E. Newcome Buoy has been moved 1 cable S.S.W., and now lies in 7 fathoms, with—Pakefield church, in line with a black building (red tiled), next northward of the lifeboat house, W. ⅛ S.; North Newcome spit buoy, N. by E. ⅛ E., distant 9 cables; S.W. Holm buoy, S.E. by E. ⅛ E., distant 2 cables.

East Middle Newcome Buoy has been withdrawn.

East Holm Buoy has been moved 1 cable N.N.E. ¼ E., and now lies in 11 fathoms, with—Corton church, its length northward of the highest house in Corton village, N.W. ¾ W., Wly.; Corton light-vessel, N.N.E. ¾ E., distant $1\frac{4}{10}$ths mile; Middle Holm buoy, S.W. ¼ S., Sly., distant $1\frac{2}{10}$ths mile.

North Holm Buoy has been moved 1½ cables S.S.W., and now lies in 5 fathoms, with—Gorleston church and South mill in line, N. ¼ W.; Lowestoft low lighthouse, S.S.W. ⅛ W., distant $1\frac{7}{10}$ths mile; Holm End buoy, S.E. ¼ S., distant 6 cables.

Middle Haisborough Buoy has been moved ¾ of a mile S.S.E., and now lies in 11 fathoms, with—Edenthorpe and Bacton churches in line, W. ⅛ S.; North Haisborough light-vessel N.N.W. ¾ W., distant 5 miles; South Middle Haisborough buoy, S.S.E. ¾ E., distant 3 miles.

A new 8-feet *Cylinder* buoy, painted *black* and *white*, in vertical stripes, and named *North Middle Haisborough*, has been placed S. ¼ E. of North Haisborough buoy, and lies in 10 fathoms, with—East Ruston and Haisborough churches, in line, S.W. ⅛ W.; North Haisborough light-vessel, N.W. by N. ¼ N., distant $2\frac{3}{10}$ths miles; North Haisborough buoy, N. ⅛ W., distant 2 miles.

Foulness Rocks.—A 9-feet *conical* buoy has been substituted

for the can buoy at Foulness rocks, and has been placed ½ a mile N.N.W. of the former position, and now lies in 6½ fathoms, with—Cromer lighthouse, S.W. by W. ½ W., distant $1\frac{7}{10}$ths mile; Haisborough high lighthouse, its full length westward of Haisborough church, S.S.E., Ely.; East Sherringham buoy, N. by W. ½ W., distant $6\frac{8}{10}$ths miles.

Note.—All depths given are at low water spring tides. *Variation*, 17¾° *W.*

807.—England.—*East Coast.—Humber River.—Extension of Hull Middle Sand.*—In consequence of Hull Middle sand having extended to the northward, more especially near Buoy No. 10, (black and white vertical stripes) mariners are cautioned, in vessels drawing 15 feet and upwards, when rounding the northern end of Hull Middle sand, not to bring the High light at Salt End open southward of the Low light, and to give Buoy No. 10, a good berth.

808.—England.—*East Coast.—Warkworth Harbour.—Alterations in South Pier Tidal Light.*—It is a *fixed white* light southward of the bearing W. by N. ¼ N.; *fixed red* northward of that bearing: elevated 35 feet above high water, and visible 5 miles.

Note.—This light is only exhibited while there is a depth of 10 feet on the bar of Warkworth harbour; when the sea is too high to allow vessels to enter, it will not be shown. *Variation*, 20¼° *W.*

809.—North Sea.—*Netherlands.—Hook of Holland Canal.—Automatic Signal Buoy off Entrance.*—Will shortly be placed experimentally. The buoy, conical, 10 feet high, will be moored in 8¾ fathoms water, and about 1½ cable seaward of the Fairway buoy at entrance; the sound (which resembles the lowing of cattle), should be heard under favourable circumstances, from a distance of 4 miles.

Note.—Should the trial of this Automatic buoy be successful, the Fairway buoy will be removed.

810.—North Sea.—*Netherlands — Re-exhibition of Egmond-aan-Zee Lights.*—With reference to Notice 281, p. 899, on the temporary discontinuance of the lights at Egmond-aan-Zee, on 21st September the lights (fixed red) were re-exhibited.

811.—NORTH SEA.—*Ems River.*—*Delfzyl.*—*Alteration in Position of Harbour Light.*—In connection with the harbour works in progress at Delfzyl, the harbour light (fixed white) on the north mole is discontinued, in order to remove it to the stone mole (Baarsterhoofd), north-eastward of its former position.

Note.—During the period the harbour light is not exhibited, a fixed white light will be shown from the landing pier (Boomshoofd), on the north side of the harbour.

812.—NORTH SEA.—*Elbe River.*—*Schulau Light-vessel, position Altered.*—*New Channel Buoyed.*—In consequence of a new channel having been formed, Schulau light-vessel has been moved south-east of her former position for a distance of about 3½ cables, and now marks the south side of the new channel. Also the north side of this channel is marked by two buoys, painted white—buoy 2 B at the west entrance: buoy 2 A at the east entrance.

813.—NORWAY.—*South Coast.*—*Skagerrak.*—*Light on Store-Grönningen Island.*—Exhibited from a lighthouse erected on the south-west extreme of the island, eastward of Homborgö. It is a *fixed and flashing* light, showing a *fixed* light for *thirty seconds*, followed by *four flashes* which, with the intervening eclipses, occupy an interval of *thirty seconds;* elevated 71 feet above the sea, and visible 15 miles. The lighthouse, with keeper's dwelling attached, is painted white. Position as given, lat. 58° 15′ 20″ N., long. 8° 32′ 15″ E.

Note.—Vessels when approaching Homborgö from the southward, and intending to enter Homborg sund through the east entrance should, when at a distance of one mile from Store-Grönningen lighthouse, bring it bear N. by W., and pass close west of it, in order to avoid Grönning sund boe rock which lies S.W. by S. from the lighthouse, distant 1½ cables. *Variation,* 14½° *W.*

814.—NORWAY.—*South Coast.*—*Skagerrak.*—*Light on Kjeholmen.*—Exhibited from a lighthouse erected on the south-west extreme of Kjeholmen, north-east of Lyngö. It is a *fixed and flashing red* light, showing a *red flash every alternate minute;* elevated 68 feet above the sea, and visible 14 miles. The light-tower, with keeper's dwelling attached, is painted white. Position as given, lat. 58° 38′ 20″ N., long. 9° 9′ 30″ E.

315.—SWEDEN.—*Skagerrak.*—*Wäderöbod Fog-Signal.*—The gong at the lighthouse on Wäderöbod islet, Wäder islands, is discontinued.

316.—BALTIC ENTRANCE.—*The Sound.*—*Flint Channel.*—With reference to Notice 251, p. 810, the following alterations have been made :—

(1.) *Oscargrund Light-Vessel* is established, and moored in position northward of Oscargrund. It shows a *fixed white* light, visible 8 miles. The light-vessel, painted red, has the word *Oscargrundet* on her sides. Position on chart, lat. 55° 35′ 40″ N., long. 12° 51′ 25″ E. During thick and foggy weather, a bell will be sounded *twice* in quick succession every *two minutes.*

(2.) *Kalkgrund Light-Vessel.*—*Alterations.*—Shifted to a position northward of Kalkgrund. It is now a *flashing white* light, showing a flash every alternate *second*, visible 8 miles. The light-vessel, painted red, has the word *Kalkgrundet* on her sides. Position, lat. 55° 36′ 50″ N., long. 12° 53′ 40″ E. During thick and foggy weather, a bell will be sounded *three times* in quick succession every *two minutes.*

Note.—Oscargrund and Kalkgrund light-vessels kept in line lead through Flint channel in the deepest water (not less than 23 feet), and should be passed on their north-western side.

(3.) *Siollen Light-Vessel*, formerly moored eastward of Siollen bank, is *withdrawn.*

(4.) *Malmö Low Light.*—*Alteration in Sectors.*—In connection with the altered positions of the light-vessels in Flint channel, the following alterations have been made in the sectors of the outer (lower) light at Malmö. It now shows a *fixed red* light between the bearings S. 180° W. and S. 68° E.; a *fixed white* light between S. 68° E. and S. 80° E.; a *single flash* between S. 80° E. and S. 85° E.; a *fixed white* light between S. 85° E. and N. 78° E.; and *two flashes* in succession between N. 78° E. and N. 59° E. *Variation*, 12° *W.*

317.—BALTIC.—*Sweden.*—*Carlskrona.*—*Alteration in Lights.*—With reference to Notice 286, p. 900, a light is now exhibited from a fortified tower on Godnott rock, Carlskrona outer road. To the southward, this light shows *two white flashes* in succession,

of *one second* duration each, at intervals of *four seconds*, between the bearings N. 18° E. and N. 23° E.; a *fixed white* light between the bearings of N. 23° E. and N. 26° E., indicating the fairway channel to Carlskrona outer road (within this sector the least water is 6¾ fathoms); and a *red flash* of *one second* duration at intervals of *four seconds*, between the bearings N. 26° E. and N. 37° E. To the westward, a *fixed white* light is shown between the bearings N. 85° E. and S. 85° E., indicating the western channel to Carlskrona (within this sector the light is frequently obscured by land). The light is elevated 58 feet above the sea; the white light should be seen 16 miles; the red light, 12 miles. On the north side of Godnott lighthouse there is exhibited a harbour light, which, with the gaslight near the Royal Marine wharf at Carlskrona, marks the Getskär and Basare shoals, and leads through the channels to the inner road, and to the anchorage for merchant vessels. This harbour light and the gas light are exhibited fron 1st August to 15th May following. On the exhibition of Godnott rock light, the light-vessel *Odin* would be withdrawn, and the harbour light on the fortification wall would be discontinued. *Variation*, 10° *W*.

318.—GULF OF BOTHNIA.—*Sweden.—Sundswall.—Light on Draghall Rock.*—The temporary fixed and flashing light, pending the construction of a lighthouse, on Draghall rock, approach to Sundswall harbour has been removed and the permanent light exhibited. Particulars regarding the different sectors of the light will be published in due course.

319.—GULF OF BOTHNIA.—*Sweden.—Piteå.—Light on Lilla Leskär.*—The light shows a *fixed white* light in the fairway entrance between New Grän and Sora shoals; a *single flash* westward of that sector; and *two flashes* eastward of it. Northward of Lilla Leskär rock, the light shows *fixed white* in the channel between Tallscar and Nygrund; *fixed green* westward of that sector; and *fixed red* eastward of it: visible 11 miles. Further particulars of these sectors will be published in due course.

320.—FRANCE.—*North Coast.—Buoy on Vergoyer Bank.*—On the north head of Vergoyer bank a buoy, conical and painted red and black in horizontal bands, is moored in 13 feet water.

321.—France.—*North Coast.—Signal Buoy near Cape Gris-nez.*—An automatic (self-acting whistle) signal buoy has been placed about 2½ miles S.W. ½ S. of cape Gris-nez. The buoy is painted red and black in horizontal bands. *Variation,* 17¾° *W.*

322.—France.—*North Coast.—Portrieux Light.—Intended Alteration in Position.*—The harbour light (fixed red) at Portrieux will shortly be exhibited from a new pier head, which has been extended 216 yards. While the lighthouse is being removed to its intended position, a provisional light (fixed red) will be shown from near the old position of the lighthouse, elevated 13 feet above high water, and visible about 4 miles. Further Notice will be given of the date on which the permanent light will be exhibited.

323.—France.—*West Coast.—Gironde River.—Patiras Isle Light.—Increased Visibility.*—Now exhibited from a square tower erected 36 feet westward of the former position of the light. The light (flashing) is elevated 72 feet above high water, and is visible 18 miles.

324.—Mediterranean.—*France.—Distinction Between the Light Towers at Hérault River Entrance.*—To distinguish the two light-towers at the entrance to the Hérault river, there has been placed on the south face of the tower, at the extremity of the west jetty, an *open-work balloon-shaped* attachment on a level with the balustrade, and a *black basket-work sphere* on top of the cupola.

325.—Mediterranean.—*Corsica.—Proposed Harbour Light at Macinaggio.*—To be placed on the extremity of the south jetty at Macinaggio, in lat. 42° 58′ 15″ N., long. 9° 27′ 8″ E.

326.—Mediterranean.—*Algeria.—Light on Habibas Island.*—Exhibited from a lighthouse on the summit of the western Habibas island. It is a *fixed white* light, elevated 366 feet above the sea, and visible 9 miles. The lighthouse is constructed of masonry, and stands in the centre of a rectangular building. Position on chart, lat. 35° 43′ 20″ N., long. 1° 8′ 00″ W.

327.—Mediterranean.—*Malta.—Marsamuscetto Harbour.—Harbour Light on Fort Manoel.*—Exhibited from an iron pillar on fort Manoel, 38 yards within the eastern extremity of Jezirah

island, Marsamuscetto (Quarantine) harbour. It is a *fixed white* light, elevated 21 feet above the sea, and visible 2 miles. Approaching the harbour, this light is visible between the bearings W. by N. ¼ N. and W. ¾ S. Within the harbour, it is visible eastward of a line joining Valetta and Sliema landing places, through an arc of 180°, or between the bearings N. by W. and S. by E. *Variation*, 11¼° *W.*

328.—MEDITERRANEAN.—*Cyprus.*—*East Coast.*—*Famagousta, position of Danger near Fairway Entrance.*—With reference to Notice 257, p. 811, relative to a detached sunken rock with 21 feet water over it, the following information as to its position has since been received. This rock lies N. by W. ¼ W., 518 yards from the buoy placed to mark the northern end of the line of reefs and shoal ground running parallel to the shore northward from Messanisi island. The rock is 1½ cable northward of the channel with 34 feet water, indicated by the leading beacon on the shore abreast kept in line with the peak of the Holy Cross mountain, near Larnaca. From the rock the leading beacon bears S.W. ¼ W. *Variation*, 8¾° *W.*

329.—ADRIATIC.—*Italy.*—*Port Bari.*—New light established, and alterations made as follows:—

(1.) *Light in New Harbour.*—Exhibited from an iron stanchion above a small white building situated 36 yards from the shore, and 492 yards westward of the castle, at the new harbour, port Bari. It is a *fixed green* light, elevated 26 feet above the sea, and visible through an arc of about 44°, or between the bearings S. by W. and S.E. by S., from a distance of 5 miles. Position as given, lat. 41° 7′ 35″ N., long. 16° 51′ 50″ E.

Note.—This light is only visible between St. Cataldo point and the beacon buoy marking the submerged extremity of the works in progress—thus indicating the fairway to the harbour. Vessels approaching from the eastward, having made the breakwater red light, should open the green light and then steer towards the harbour, leaving the red light on the port hand. Approaching from the north-west, the green light will be opened on passing St. Cataldo point, when the harbour may be steered for.

(2.) *Alteration in Position of Breakwater Light.*—The red light

shown from the breakwater has been shifted to the westward, and is now situated 241 yards from the outer end of the works above water, and 323 yards from the submerged extremity.

(3.) *Alteration in Buoy at Entrance.*—The beacon buoy marking the submerged extremity of the breakwater (distant from it 24 yards), is now surmounted by a ball painted in red and white stripes, in place of the bell as previously. *Variation*, 9¾° *W.*

330.—Adriatic.—*East Coast.—Cazza Islet.—Light on Gradisca Point.*—With reference to Notice 44, p. 180, on the provisional exhibition of a fixed red light on Gradisca point (known also as Trisciavar point), the south-west extreme of Cazza islet, the permanent light is now exhibited. It is a *flashing white* light, elevated 308 feet above the sea, and visible 24 miles, except where it is obscured by the land, between the bearings S. 43° W. and S. 83° W. The lighthouse, quadrangular, and painted red and white in vertical stripes, rises from the centre of the keeper's dwelling, which is of two stories. Position, lat. 42° 45′ N., long. 16° 29′ E. *Variation*, 9¾° *E.*

331.—Black Sea.—*Odessa.—Lights near Quarantine Mole Head.*—Exhibited 39 yards from the mole head; they are *fixed red* lights, placed vertically; the upper light elevated 23 feet above the sea, and visible 10 miles; the lower light, 18 feet above the sea, should be seen 9 miles.

Note.—These lights cannot be exhibited in very bad weather.

332.—Africa.—*West Coast.—Congo River.—Directions for Banana Creek.—Anchorage.*—This anchorage may safely be entered by vessels drawing 18 feet. The anchorage is in 3 fathoms, soft mud, with plenty of room to swing.

Supplies.—Coal and a limited quantity of supplies may be obtained from the Dutch house.

Directions.—Vessels from the northward being inshore, will find it best to cross the current from Red point, make Padron point, and stand in and follow the coast along, keeping only a safe distance out up to the anchorage in Turtle cove or inside Shark's point, as desired; provided always for sailing vessels the breeze is sufficiently strong. For sailing vessels wishing to cross over to the

anchorage off French point or to enter Banana creek, the usual directions are explicit and reliable. For steamers, however, the following additional directions will be found useful. From Shark's point steer for Boolambemba point, keeping south point of mountain range back of Banana, bearing E.N.E. or to the northward of that bearing to guard against being set on to Mona-Mazea bank by the current; for, although heading for Boolambemba point, the vessel will steadily be set toward the anchorage, and it will be found best to keep her heading well up to the current; by slowing down the engines or by shortening sail she will readily drop to the anchorage, which should be approached by the bearings and keeping the lead going. *The buoy should not be relied on.*

Bearings.—From the buoy, when in position, south point of mountain range bears E.N.E. ¼ E. and Boolambemba point S.E. ½ E. These bearings are given, because, from the difficulty of keeping the buoy in position, it is frequently the case that there is none to be seen. *Variation,* 19½ *W.*

Caution.—In crossing over to the anchorage off French point or to Banana creek harbour, there is danger of being set by the current on to Mona-Mazea bank or on French point spit, and as the strength of the current varies with the state of the river and with the tides, a stranger unacquainted with the landmarks and bearing will find it advantageous to employ the local pilot, who can always be obtained by the usual signal.

333.—Africa.—*West Coast.*—*St. Paul de Loando.*—The following particulars are to hand in respect to various lights:—

(1.) *Loando Reef Light.*—A light-vessel has been placed about 3½ cables north-eastward of the extremity of Loando reef, St. Paul de Loando harbour. It is a *fixed white* light, elevated 57 feet above the sea, and visible about 7 miles. The light-vessel painted red, with the words *Pontao Pharol* on her sides, has one mast with small red ball at masthead, and is moored in 19 fathoms at low water, with the following marks and bearings, viz.:—Country house (Quinta) in line with fort San Pédro, S. ½ W., north extreme of fort San Miguel point, in line with south-east extreme of Loando island, S.W. by W. ¾ W.

(2.) *Beacon Lights.*—Two fixed *red* lights are exhibited from

beacons erected to mark the channel for small vessels to the landing place in St. Paul de Loando harbour. The outer beacon, of stone, showing a light elevated 20 feet above the sea, is situated at the north end of a small ledge of rocks, lying N. ½ W. of Isabella point (4½ cables westward of the coal depôt); a buoy, painted red, is moored at the south-east extreme of this ledge in 6 feet water. The inner beacon marks the wreck of a sunken vessel.

Note.—The channel is eastward of the beacons and buoy.

(3.) A *Time Ball* is hoisted half-mast on the staff of the observatory tower at 0h. 50m. p.m.; close up at 0h. 55.m.; and dropped at 1h. 0m. p.m. mean time, St. Paul de Loando.

Note.—It is reported that dependence cannot always be placed on the accuracy of this time ball. *Variation*, 22¼° W.

334.—India.—*Bay of Bengal.—Madras Road.—Extension of Harbour Works.*—With reference to Notice in 1878, on the Inner limit of anchorage in Madras road, in consequence of the extension of the harbour works, the Northern and Southern Port buoys (red and white vertical) have been moved into 8 fathoms water. These buoys are *danger* buoys, and mariners are cautioned not to pass inshore of them, nor to come under 8 fathoms at night, as the rubble bases of the groins extend much farther seaward than the walls, and in some places have only 17 feet water over them. The middle or large buoy (red) is moored in 6¼ fathoms, and marks the western limit of the anchorage for steam vessels. All sailing vessels, except coasting craft, should anchor in or beyond the depth of 8 fathoms.

335.—India.—*Bay of Bengal.—False Point Anchorage.—Alteration in Signals at False Point.*—With reference to Notice 260, p. 813, on the intended temporary discontinuance of False Point light, and the exhibition of a blue light and rocket every fifteen minutes, on 1st November, 1879, and during the intended improvements, a blue light, immediately followed by a rocket, will be burnt from the upper part of the lighthouse every *half-hour* from sunset to sunrise, for a period of three months from that date. Further notice, with particulars of the new light, will be given in due course.

336.—Cochin China.—*Sunken Danger North-West of Pulo*

Canton.—Volta bank, discovered in 1874, on which there is a depth of about 13 feet, coral, lying N.W. ½ N. approximately, 7¼ miles distant from the North-west extreme of Pulo Canton, is said to be situated in lat. 15° 29′ 25″ N., long. 109° 2′ 40″ E. *Variation,* 2° *E.*

337.—Eastern Archipelago.—*Sourabaya Strait.—Sourabaya Light-Vessel.—Alteration in Position.*—In consequence of the changes that have taken place in the bank extending off Solo river entrance, Sourabaya light-vessel has been shifted about three-quarters of a cable eastward of her former position, and is now moored with the following bearings, viz., flagstaff on Panka point, W. by N. ½ N.; Sawo point, S. by W. *Variation,* ½° *E.*

338.—Eastern Archipelago.—*Sulu Island.—Light in Sulu Road.*—Exhibited from a tower situated about 300 yards from the shore, and 35 yards eastward of the wooden mole, Sulu road, north-west side of Sulu island. It is a *fixed red* light, elevated 35 feet above high water, and visible through an arc of 125°, or between the bearings E. ½ N. and S.S.W. ¾ W., from a distance of 6 miles. The tower, 33 feet high, and constructed of brick, has two stories. Position as given, lat. 6° 3′ 40″ N., long. 120° 58′ 45″ E. *Variation,* 1½° *E.*

339.—Australia.—*North-West Coast.—Reported Existence of Dangerous Rocks South-west of Rowley Shoals.*—On the authority of M. Charles Pertis, master of the French ship *Eldorado*:—On 20th May, 1879, at 8 p.m., the weather being cloudy with rain, wind from the northward, the ship *Eldorado* (then proceeding to Lacepede island), in lat. 18° 24′ S., long. 117° 47′ E. of Greenwich, sighted two rocks bearing N.N.W. distant 5 or 6 miles, apparently extending in an east and west direction: one of these rocks was of a considerable size, and estimated to be 16 or 18 feet high. When first sighted, the ship was hauled to the wind, and a sounding of 105 fathoms obtained, a course was then shaped for Lacepede island, at which place the ship arrived on 22nd May, at 2. 45 p.m.; light breezes from West to S.S.W. having been experienced in the interval. The foregoing account places the rocks in (approximately) lat. 18° 20′ S., long. 117° 45′ E. *Variation,* 1¼° *W.*

840.—SOUTH AUSTRALIA.—*Gulf of St. Vincent.—Channel leading to Port Adelaide.*—With reference to Notice 264, p. 814, owing to unforeseen circumstances, gas lights will not be exhibited from the beacons erected in the channel leading to port Adelaide until a date which will be given hereafter.

841.—SOUTH AUSTRALIA.—*River Murray.*—The light heretofore shown from a rock near the Swanport Ferry, River Murray, is not considered necessary, and will be discontinued.

842.—AUSTRALIA.—*South Coast.—Port Phillip.—Shoal on the North Side of South Channel.*—At entrance to port Phillip :—This shoal, 200 yards in length north and south, and half a cable in width, has 21½ feet over it at low water, and lies with the following bearings, viz., Buoy No. 1, S.E. by E. ¾ E.; Buoy No. 3, West. This shoal is supposed to be that on which the steamship *Great Britain* touched some years since; its shoalest part is 1½ cable south of a line joining buoys Nos. 1 and 3; and 2¼ cables northward of the South channel fairway, indicated by the leading lights in line bearing E. ¾ S. *Variation,* 8½° *E.*

843.—AUSTRALIA.—*East Coast.—Harbour Light at Kiama.*—Exhibited from near the extremity of the breakwater, Kiama harbour, as a guide to vessels entering. It is a *fixed green* light. Position approximate, lat. 34° 40′ 25″ S., long. 150° 53′ E.

844.—AUSTRALIA.—*East Coast.—Port Macquarie.—Light on Tacking Point.*—It is a *fixed white* light, visible about 10 miles. Position approximate, lat. 31° 28′ 40″ S., long. 152° 57′ 20″ E.

845.—AUSTRALIA.—*East Coast.—Cumberland Islands.—Reef Northward of K 2 Isle.*—This reef (*Phillis reef*), reported by the master of the brig *Phillis*, is described as being about half a mile long N.N.W. and S.S.E., by 200 yards wide, and lying with the following bearings, viz., L 2 Isle, W. by N. ½ N.; L Isle, W. by S.; K 2 Isle, S. by W. These bearings place the reef in (approximately) lat. 20° 52′ S., long. 149° 51½′ E. *Variation,* 7¾° *E.*

846.—UNITED STATES.—*Pacific Coast.—Washington Territory.—Light on Point Wilson, Puget Sound.*—On and after December 15, 1879, a *fixed white* light, lighting 270° of the horizon, will be

shown from the top of the keeper's dwelling recently erected at Point Wilson, south side of Admiralty inlet.

347.—UNITED STATES.—*North Carolina.—Cape Fear River.—Intended Discontinuance of Federal Point Light.*—To be discontinued on 1st January, 1880, in consequence of the closing of New inlet, mouth of cape Fear river.

348.—UNITED STATES.—*Delaware Bay.—Five-Fathom Bank.—Light-Vessel Replaced with Fog-Signal.*—Light-vessel, No. 40, replaced at her station; and during thick and foggy weather a 12-*inch* steam-whistle will give a blast of *four seconds'* duration *every minute.*

349.—UNITED STATES.—*Long Island Sound.—Fog-Signal at Falkner Island.*—At the lighthouse, a 10-*inch* steam-whistle, which, during thick and foggy weather, will give blasts of *eight seconds'* duration at intervals of *fifty-two seconds.*

350.—UNITED STATES.—*Rhode Island.—Newport.—Change of Colour of Lime Rock Light.*—Is now *fixed red*, instead of fixed white as formerly shown.

351.—UNITED STATES.—*Massachusetts.—Sunken Rock in Main Ship Channel, Boston.*—In the narrows between Gallop and Lovell islands, Main Ship channel, approach to Boston harbour. This rock, on which the United States ship of war *Constellation* grounded while entering the harbour, July, 1879, lies with the following bearings, viz., Narrows lighthouse, S. 51¼° E.; Boston lighthouse, S. 79¼° E.; Sunken ledge beacon, S. 50¾° W.

352.—CANADA.—*Bay of Fundy.—East Coast.—Lights on Pease Island.*—Two lights are exhibited from a lighthouse recently erected on the south point of Pease island, Tusket islands. The principal light is an *occulting* light, showing alternate *red* and *white* flashes of *fifteen seconds'* duration each, at intervals of *forty-five seconds;* elevated 56 feet above high water, and visible 12 miles from all points of approach from the southward, and through the Schooner and Ellenwood passages. A *fixed red* light is also exhibited from a window of the lighthouse, 16 feet below the principal light; visible between the bearings N.W. by N. and W. by N. ½ N., marking the channel between Old Man and Old Woman rocks, and should be seen 4 miles. The lighthouse, 42 feet high, constructed of wood

and painted white, consists of a square tower with keeper's dwelling attached. Position, lat. 43° 37′ 35″ N., long. 66° 1′ 40″ W. *Variation*, 17½° *W.*

353.—CANADA.—*Nova Scotia.—S.E. Coast.—Whitehaven.—Light on Three Top Island.*—Exhibited from a lighthouse recently erected on the south-east point of Three Top island, entrance to Whitehaven. It is a *fixed white* light, elevated 48 feet above high water, and visible 11 miles. The lighthouse, 32 feet high, constructed of wood and painted white, consists of a square tower with keeper's dwelling attached. Position, lat. 45° 12′ 40″ N., long. 61° 9′ 40″ W.

Note.—This light is obscured when bearing eastward of N.E. by E., thus indicating the dangers on the northern side of the western passage at the harbour entrance. It is visible from all other points of approach, except where intercepted by the high land of White Head island. *Variation*, 23° *W.*

354.—GULF OF ST. LAWRENCE.—*Chaleur Bay.—Ristigouche River.*—The undermentioned leading lights are exhibited from lighthouses recently erected on the banks of Ristigouche river:—

(1.) *Lights at Dalhousie.*—Two leading lights are exhibited at Dalhousie, south side of the river entrance. The outer light, elevated 24 feet above high water, is shown from the public wharf. Position, lat. 48° 4′ 40″ N., long. 66° 22′ 30″ W. The inner light, elevated 27 feet above high water, is shown from Montgomery island.

(2.) *Lights at Oak Point.*—From the outer lighthouse at Oak point, on the north bank of the river, two lights are exhibited, one east and the other west, elevated 40 feet above high water. Position, lat. 48° 2′ 40″ N., long. 66° 36′ 30″ W. A light, elevated 45 feet above high water, is shown from the inner lighthouse, which, with the outer lighthouse, guides vessels crossing the Traverse.

(3.) *Lights at Campbell-Town.*—Two leading lights are exhibited at Campbell-town on the south bank of the river. The outer light, elevated 24 feet above high water, is shown from a pier near the

railway wharf. Position, lat. 48° 0′ 50″ N., long. 66° 39′ 40″ W. The inner light, elevated 24 feet above high water, is shown from Moffat's wharf.

The above-mentioned lights are *fixed white*; the lighthouses are square towers, 22 feet high, constructed of wood and painted white.

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1879.

No. 17.—West India Pilot, Vol. I., Notice 8: information relating to various parts of the north coast of South America and to Central America, the Caribbean sea and Gulf of Mexico.

No. 18.—Mediterranean Sea—Archipelago; information relating to port Jero or Olivieri in Mityleni island (*cancels* No. 1 of 1877).

No. 19.—Newfoundland Pilot, Notice 1; information relating to Placentia bay.

No. 20.—Newfoundland Pilot, Notice 2; information relating to Notre-Dame or Green bay.

No. 21.—South Indian Ocean, Notice 16; information relating to the south-west coast of Madagascar.

Charts, &c., Published by the Hydrographic Office, Admiralty, in July and August, 1879.

No.		*s.*	*d.*
2052	England, east coast:—Harwich approaches (plan Woodbridge haven)	2	6
2248	North America, west coast:—Anchorages in the gulf of California—Pulpito, Mangles anchorages; Puerto Refugio; Amortajada, Santa Teresa, and San Francisquito, Salinas bays; San Lorenzo channel; Pichilingue harbour	1	6

No.		s.	d.
678	North America:—Lakes Erie and Huron (plans, Rattle-snake, Collingwood, Penetanguishene, Goderich, Rondeau harbours; port Huron) ...	2	6
476	Haiti or San Domingo:—Cayes, Flamand, St. Louis, and Meste bays	1	6
2691	Pacific ocean:—Fiji islands	2	6
952	Japan, south coast of Nipon:—Owasi bay to Takamatsu-no-saki, including Owari and Mikawa bays (plans, Nag Ura; Toba anchorage)	2	0
664	Africa, east coast:—Sheet 10, from 6° 38′ S. to 4° 28′ S., including the islands of Zanzibar and Pemba	1	6
711	Mauritius island	2	6
1930	North America, west coast:—Magdalena bay (plans, San Lucus, San José del Cabo bays and North channel)	2	6
250	Plan of Odzutsu harbour added.		
1689	Enlarged plan of Pontinha bay added.		
1323	Plan of Ancon bay and adjacent islands added.		
993	Plan of Sutt bay added.		

Book.—China Sea Directory, Vol. II., second edition, 1879, 3s. 6d.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1879.

(*This List is completed to the* 18*th of each Month.*)

369.—*Eagle*, s.s.; iron; built at Dundee, 1858; owned by Mr. J. N. Moore, of Loulas, near Neath; tonnage, 193; Swansea to Dublin; coals; abandoned at sea, July 29, 1879. Inquiry held at Swansea, August 23, 1879, before Rothery, Wreck Commissioner; May, Engineer Assessor, and Beasley, N.A. Casualty caused by the breaking of that part of the discharge pipe which was inside the port bunker. Superintending engineer to blame for not having seen that the discharge valve was removed to the side of the ship, but the chief engineer not justified in abandoning the vessel so speedily, seeing that he made no effort whatever to stop or reduce the leak, which was apparently perfectly under his control. Certificate of chief engineer suspended for six months; recommended for one as second engineer during his suspension.

374. *Victor*, steam-tug; wood; built at Middlesbro', 1863; owned by Henry Quinn and others; tonnage, 79, gross; employed towing a vessel to sea from Belfast; explosion of boiler on the 10th August, 1879, by which loss of life ensued. Inquiry held at Belfast, September 9, 1879, before Lloyd, Judge; Holt and May, Nautical and Engineer Assessors. Owners in default, in allowing vessel to proceed in an unseaworthy condition. Ordered to pay the costs of the inquiry.

375. *Nankin*, s.s.; built at Low Walker, on the Tyne, 1875; owned by E. H. Watts, of London; tonnage, 1,829; London to Penarth; ballast; stranded at Porthbeer Cove, Cornwall, August 11, 1879. Inquiry held at Falmouth, September 15, 1879, before Bennetts and Newman, J.P.; Powell and Castle, N.A. The mate, who had charge of the deck previous to the casualty, in default for not calling the master, for omitting to use the lead, and for running at too great a speed. His certificate as master was sus-

pended for three months, and recommended for one as mate during that time.

876. *Kathleen*, barge, and *Maas*, s.s.; the former built at Sittingbourne, 1876; owned by A. H. Lavers, of Nine Elms; tonnage, 43; Sittingbourne to London; bricks. The latter a paddle-steamer, built at Northfleet, 1864; owned by the General Steam Navigation Co.; tonnage, 550; London to Harlingen; ballast; in collision at Northfleet Hope, August 20, 1879, when the master of the *Kathleen* was drowned. Inquiry held at Westminster, September 10, 1879, before Rothery, Wreck Commissioner; Hight and Forster, N.A. Casualty due to the steamer not keeping out of the way of the barge as she was bound to do. Pilot in charge of steamer alone to blame.

877. *Norfolk*, ship; built at Blackwall, 1857; owned by J. H. Howard, Manchester; tonnage, 953; river Gambia to Marseilles; ground nuts and ballast; lost on Boa Vista, July 12, 1879. Inquiry held at Westminster, September 4, 1879, before Rothery, Wreck Commissioner; Knox and Hight, N.A. Master in default for setting improper courses, for making no allowance for set of current, and for leaving the deck at a critical time. Certificate suspended for six months.

878. *City of London*, s.s., and *Vesta*, s.s.; the former built at Aberdeen, 1871; owned by the Aberdeen Steam Navigation Company; tonnage, 564; London to Aberdeen; cargo and passengers. The latter vessel belonging to Hamburgh; tonnage, 623; Hamburgh to London; cargo and passengers; in collision in Barking Reach, August 13, 1879. Inquiry held at Westminster, September 13, 1879, before Rothery, Wreck Commissioner; Hight and Forster, N.A. *Vesta* alone to blame; pilot in charge of that vessel in default for not porting his helm when the *City of London's* lights were reported to him; also to blame for starboarding his helm to pass certain barges to the south of him instead of avoiding them to the northward.

380. *Wolviston*, s.s.; built at Hartlepool, 1876; owned by Messrs. Mullins and Young, of that port; tonnage, 869; Middlesbro' to Leghorn; steel rails; lost on the Cabezo Shoals, off coast of Spain, August 10, 1879. Inquiry held at Middlesbro', September

13, 1879, before Coleman, J.P.; Grant and Beasley, N.A. Master in default for not verifying his compass by means of an azimuth observation, and for not being on deck when in the vicinity of such well-known shoals. Master's and chief mate's certificates suspended for six and three months respectively.

381. *Azela*, snow; built at Tyne Main, 1858; owned by J. Eltringham, of Blyth; tonnage, 186; Blyth to the Baltic; coals; stranded on Knuds Head, Baltic Sea, July 25, 1879. Inquiry held at North Shields, September 11, 1879, before Tully and Bell, Justices; Grant and Beasley, N.A. Master to blame for not using the lead and for going below when near the land. Certificate suspended for two months.

382. *Pleiades*, brigantine; built at Prince Edward's Island, 1868; owned by T. McVeagh; tonnage, 199; Androssan to St. Malo; coals; took fire and subsequently stranded on Kilroot Point, Belfast Lough, August 21, 1879. Inquiry held at Belfast, September 18, 1879, before O'Donnell, Judge; Holt and Ward, N.A. Casualty entirely due to accident.

393. *Brittany*, s.s.; built at Wallsend, 1871; tonnage, 539; Bilbao to Newport; iron ore; explosion of the boiler, off Cardiff Roads, August 9, 1879, by which loss of life ensued. Inquiry held at Cardiff, September 24, 1879, before Jones, Stip. Mag.; Aplin and Ravenhill, Nautical and Engineer Assessors. Superintending engineer to blame for not properly examining the boilers and domes, and for not ascertaining, from time to time, that they were in a safe condition. The Court regretted that it was not in their power to deal with his certificate. Chief engineer cautioned.

394. *Perseverance*, barque; owned by R. Stoker, of Liverpool; tonnage, 592; Quebec to Sunderland; timber; stranded on Magdalen Island, July 25, 1879. Inquiry held at North Shields, September 24, 1879, before Cleugh and Swan, Justices; Holt and Castle, N.A. Master exonerated. Certificate returned.

395. *Mallard*, s.s.; built at Whiteinch, Glasgow, 1872; owned by Wm. Laing, of Leith; tonnage, 599; London to Newcastle; ballast. Stranded on the south side of Flamborough Head, September 8, 1879. Inquiry held at North Shields, September 27,

1879, before Jackson and Swan, Justices; Holt and Castle, N.A. Master in default for not stopping his vessel when he heard the rocket from Flamborough Head. Certificate suspended for three months.

396. *Tirante*, s.s.; iron; built at Stockton, 1877; owned by R. J. Kay, of Birtley; tonnage, 782; Dantzic to Honfleur; railway sleepers; stranded on the Smyge Shoal, Baltic Sea, August 13, 1879. Inquiry held at Middlesbro', September 30, 1879, before Coleman, Judge; Holt and Castle, N.A. Casualty due to use of incorrect chart. Master and chief officer acquitted of blame.

398. *Meirion*, ship; built at Sunderland, 1878; owned by the Arvon Shipping Company; tonnage, 1,372; Sunderland to Bombay; coals; lost on Reckham Sands, near Prawle Point, September 7, 1879. Inquiry held at Plymouth, September 26, 1879, before Rothery, Wreck Commissioner; White and Parfitt, N.A. Master to blame for steering improper courses, for not attending to the compasses, and for neglecting the use of the lead. Certificate suspended for six months.

Official Inquiries Abroad.

375. *Tidal Wave*, schooner; wrecked on the Bar, Richmond River. Inquiry held at Sydney, July 21, 1879. Master censured and cautioned to be more careful in future.

383. *State of Virginia*, s.s.; wrecked on Sable Island, July 11, 1879. Inquiry held at Halifax, N.S., August 26, 1879. Master to blame for not using the lead, and for running too close to the land in thick weather. Certificate suspended for three months.

384. *Bright Planet*, schooner; lost by fire at Port Davey, May 30, 1879. Inquiry held at Hobart Town, June 23, 1879. Master to blame for leaving his ship totally deserted. Certificate suspended for six months.

385. *Woonona*, s.s., and *Terrigal Packet*, schooner; in collision in Sydney Harbour. Inquiry held at Sydney, July 21, 1879. Collision caused by the master of the *Woonona* committing a breach of the 15th Article of the Steering and Sailing Rules.

886. *Titania*, schooner; wrecked at the entrance of Brunswick River. Inquiry held at Sydney, July 7, 1879. No evidence on which to found a charge against the master.

887. *Trinculo*, barque; stranded on the 90-Mile Beach, May 30, 1879. Inquiry held by the Steam Navigation Board, June 20, 1879. Casualty due to stress of weather. Master and crew free from blame.

888. *Akbar*, brigantine; wrecked on the beach near Timaru, June 29, 1879. Inquiry held at Timaru, July 25, 1879. Casualty due to stress of weather.

889. *Emma and Alice*, barque; sprung a leak and abandoned at sea. Inquiry held at Sourabaya, July 22, 1879. Master exonerated from blame.

390. *Hedwig*, barque; grounded at West Sin Sin, River Min, July 18, 1879. Naval Court held at Foochow, July 26, 1879. Pilot to blame for getting too close to the shore and into eddy water.

891. *Chance*, cutter; abandoned at sea. Inquiry held at Sydney, July 7, 1879. No evidence adduced upon which to found a charge against the master.

392. *Kalahome*, barque; stranded off Glen Point, Rivoli Bay, July 25, 1879. Inquiry held at Port Adelaide. No proceedings taken against the master.

THE

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FORTY-EIGHTH YEAR.

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THE CAPTURE OF THE "HUASCAR."

THE war now being waged in the Pacific has proved to be chiefly a naval one. Those who are acquainted with the States which are parties to the quarrel, will have been prepared to find it so. Chili is practically an insular power. She is all but absolutely secure from attack on every side except by sea. At the same time she cannot well engage in any offensive operation into which the naval element does not largely enter. In England it has not been sufficiently remembered that both Chili and Peru have a naval history which can be carried back to a respectably remote date. Peru in great measure owes her freedom to the gallantry of the Chilian navy. Half-a-century has elapsed since Cochrane and his companions displayed a spirit of naval daring in the Pacific which recent events have shown has not become extinct. The career of the *Huascar*—either under rebel chiefs, as in her engagement with the British ships of war, *Shah* and *Amethyst*, or during the existing conflict—and the behaviour of the officers and men of the Chilian *Esmeralda* earlier in the war, may be taken as proofs of skill and boldness which would not discredit any navy in the world.

We are now in possession of tolerably full information concerning the late Chilian victory. Without doubt several details of the

story of the capture of the *Huascar* are still wanting; but they are chiefly such as would be of technical interest to the naval gunner or constructor. As an action on the high seas between ironclads, in which both the principal types, viz., the turret and broadside ship were represented, fought by able and resolute antagonists, the recent battle should be deeply interesting to the members of every maritime service in existence. Engagements of the kind are rare; in fact, they can scarcely be said to have ever really occurred. There were peculiarities in the conflicts at Lissa and Cartagena which would scarcely allow us to classify them with that which has just taken place off the coast of South America.

The *Huascar*, as is well known, is the same vessel which fought an indecisive action with two of Her Majesty's ships in the earlier part of 1877. On that occasion she was found to possess, to a remarkable degree, the valuable quality of handiness. The success with which she so long eluded the Chilian squadron and cruised against vessels sailing beneath the enemy's flag, showed that she was fairly endowed with speed. Several descriptions of the vessel have been published since the news of her exploits reached this country, but very few of them are quite correct in all particulars. It therefore requires no apology if we give here a list of her dimensions, taken by the present writer from a detailed account drawn up by her builders, Messrs. Laird, of Birkenhead, which accompanied the model of the *Huascar* exhibited at Paris last year. The vessel was built in 1866, or nearly fourteen years ago. Her principal dimensions are the following:—Length, 180 ft.; beam, 35 ft.; depth in hold, 19 ft. 9 in.; load draught of water, 15 ft. 6 in.; tonnage, 1,101; indicated horse-power, 1,500; speed, 12 knots. She was propelled by one three-bladed screw, and carried in her single turret two 10 in. 12-ton Armstrong guns —a calibre which has since been abandoned with ordnance of that weight—and three lighter guns on the upper deck. She had a free board of from 4½ to 5 ft., and her side was protected with armour 4½ in. in thickness, tapering to 2½ in. at the extremities. She had two masts.

In her action with the *Shah* and *Amethyst* she suffered some damage. Don Manuel Carrasco, in his official report, stated that

a 9-in. rifled shell, weighing 250 lbs., had perforated the armour of the starboard-side near the quarter. A second projectile of the same nature had indented the armour to a depth of three inches in the neighbourhood of the first. A third had fractured the turret-armour near the port of the left gun. On the port-side the armour had been penetrated by a 7 in. projectile, 115 lbs. in weight. There were other injuries of less importance. We have no means of ascertaining to what extent these far from unimportant damages had been repaired; but, judging from the habitual emptiness of the Peruvian exchequer, the costliness of the necessary repairs, and the frequently unsettled state of the Government, it is doubtful if they had been completely made good. It should, therefore, be borne in mind that the *Huascar* was, in all probability, in a state of by no means perfect efficiency when the active operations of the war began—a fact that should be allowed to tell in favour of her gallant, but unfortunate commander.

On the 8th of October, accompanied by the corvette *Union*, a full-rigged wooden vessel of 14 guns, the *Huascar* on her return from a cruise off the Chilian coast near Mexillones de Bolivia, fell in with the enemy's squadron under Admiral Latorre. This consisted of the two ironclads *Almirante Cochrane* and *Blanco Encalada*, and the wooden vessels *O'Higgins*, *Covadonga*, *Loa*, *Mattias Cousino*, and *Stata*. The Chilian vessels were in two divisions, one armour-clad being with each. The *Huascar* first sighted the foe, and indicated the fact by signal to her consort the *Union* about 3 a.m. The vessels seen by her were the *Blanco Encalada*, *Covadonga*, *M. Cousino*, and *Stata;* none of the three latter being of any great power, and one a hired or purchased merchant vessel employed as a transport.

The Peruvians, as soon as the enemy were made out, altered course to the North, and proceeded at full speed. The darkness gave them some hopes of being able to get away, hopes which, as far as the *Union* was concerned, were justified by the knowledge of her superior speed. A fog which followed aided this manœuvre; but the look-out in the Chilian squadron had been as sharp as that kept by their opponents. They had observed the latter also, and made after them. The chase lasted for some hours. At seven

Y 2

o'clock the fog lifted, and disclosed to the Peruvian Admiral another division of the enemy's ships a-head. These were he remaining armoured vessel, the *Almirante Cochrane*, and the corvettes *O'Higgins* and *Loa*, the former a vessel of good size and able to steam 12 knots. The chasing squadron had gained on the *Huascar* to within less than 7,000 yards, and the obstacle in front presented by the second detachment of the enemy led to alterations of course which enabled the pursuing ships to decrease their distance still more. Being caught between two divisions, the Peruvian chief, Admiral Gran, manœuvred to get away by hauling as close in shore as possible. Those who have sailed in the South Pacific will remember the character of the North Chilian and Bolivian coast-line, which is singularly deficient in harbours or defensible roadsteads. Near Mexillones there is a narrow inlet running in to the eastward, which affords scarcely any shelter for vessels at anchor. There was an idea on the part of the Admiral of making towards this point, which, once gained, might, for a time at least, give some chance of neutralising the enormous superiority of his enemy. The squadron a-head interfered with this, and also precluded all hope of escape inshore. At half-past nine the *Almirante Cochrane* was within range, and the division a-stern was coming up fast.

Seeing escape hopeless, Admiral Gran bravely determined to engage, in spite of the odds against him, rather than haul down his colours, as he might have done without dishonour, seeing the overwhelming superiority of his antagonists. He had reached the entrance of the bay or inlet of Mexillones, and there trusted to compel the enemy to attack him one at a time. The battle began by the firing of the *Huascar's* two turret guns, which was quickly followed up by an attempt to ram the Chilian ironclad. The commander of the *Union*, believing he could be of no assistance to his chief—a belief which the numbers and strength of the hostile ships fully justified—made the best of his way to the northward. Had he been at once pursued it was his intention to have turned upon some single antagonist which had outrun the others in the pursuit. His discretion has at all events saved to the greatly diminished navy of his country an important vessel which it could ill-afford to

lose. The armoured ships of both countries remained behind to continue the combat.

The two Chilian ships are sister vessels, and were built by Earle's Shipbuilding Company of Hull, from designs by Mr. E. J. Reed. The *Almirante Cochrane* was launched in 1874, and the *Blanco Encalada* (originally called the *Valparaiso*), in 1875. The period that had elapsed between their completion and that of the Peruvian turret-ship was marked by great progress in armoured ship construction, and these two vessels are excellent specimens of their class, and contain many modern improvements. Their dimensions will show how vastly superior in power they were to the vessel which flew the flag of the ill-fated Gran. They are as follow:—Length, 210 ft.; beam, 45 ft. 9 in.; depth in hold, 21 ft. 8 in.; draught, 19 ft. 6 in.; displacement, 3,400 tons; tonnage measurement, 2,200 tons; indicated horse-power, 2,500; speed, 12 knots.

Each vessel has two screws, and is protected throughout in the neighbourhood of the water-line by an armour-belt 8 ft. wide, containing 9-inch plates. There is a protected battery amidships of peculiar form, the after portion of which is wider than the main-deck, and projects beyond the side. In this battery are mounted six 9-in. 12-ton Armstrong guns, three on each side. These guns, though of less calibre than those of the same weight carried by the *Huascar*, are of more modern type and of greater power. The arrangement of the battery in two parts, one broader than the other, gives a great extension to the arc of fire. The corners are cut off so as to form portions of an octagon, and at each a gun is mounted, whilst where the narrower part joins the wider, a re-entering angle is formed which gives a position for the centre gun from which it can train over an arc of 105°. By the adoption of this plan of construction, two guns can be fired right a-head on each side, whilst one can be fired right a-stern from each after corner. All three on each broadside can be fired a-beam. The *Huascar's* two heavy guns being in a single turret could only be fired simultaneously in one direction, whilst her enemies had a distribution of fire, which it was long ago pointed out by British naval architects could not be attained by a turret ship.

The guns of the Peruvian were instantly replied to by the

Chilians, and as the former approached the latter in her attempts to ram, the *mitrailleuses* mounted in the tops were brought into play. The Chilian fire was very accurate, and the turret of the *Huascar* is reported as having been practically destroyed. There can be no doubt that at close quarters her armour could hardly have proved efficient against her enemy's guns. At 10 minutes to 11 a.m., Admiral Gran having been killed as well as his next two senior officers, Messrs. Aquirre and Vargas, the *Huascar* with her turret disabled was completely silenced; and, as we learn by the latest accounts received as we write, was carried by boarding from the boats of the Chilian squadron, to which but little resistance could have been offered. That she had made a good fight is certain. One shell from her alone did serious damage to the *Almirante Cochrane* and wounded ten of her crew. That vessel bore the brunt of the encounter, and is said to have fired upwards of thirty shots from her heavy guns; whilst the *Blanco Encalado* did not fire a third of that number. The crew of the *Huascar* has been variously stated. It was probably about 200 in all; of these she lost 61 killed, and all her executive officers were either killed or wounded. Her captors have succeeded in towing her into Valparaiso, which shows that her engines must have been disabled, and hope to fit her out for their own service.

The Peruvian Navy has certainly saved its honour. Admiral Gran was, strategically, completely outmanœuvred by Latorre. The cutting off of the *Huascar's* retreat, and catching her between two fires, was a triumph of strategy. Tactically, Gran showed signs of considerable skill. The attempt to bring on the action in the comparatively narrow waters of the bay, where his enemy's superior numbers would be of less importance, shows that he at once realised the necessities of his position. In that manœuvre, when retreat was no longer possible, lay his only chance of safety. The weakness of the turret-armament—aggravated when there is only one turret—in its inability to fire simultaneously over an extended arc of the horizon, was strikingly verified; and so, too, were the superior handiness and power of avoiding the ram, of even good-sized vessels which are provided with two screws. This battle certainly contains many lessons; and we should err if we were

not to be instructed by them. The report that 85 men of English nationality were amongst the *Huascar's* crew is not likely to be correct. English blue-jackets who desert from Her Majesty's ships are not likely—except in a very few instances—to be enticed into joining the Peruvian Navy; and any others would have been of a kind likely to prove an encumbrance rather than an assistance.

The foresight of the Chilian statesmen who foresaw the approach of the day when an efficient fleet would prove the safety of their country, and provided against it, deserves the gratitude of their fellow-citizens, as much as does the gallantry of Admiral Latorre and his squadron, who freed them from immediate dangers of no unimportant extent.

LLOYD'S YACHT REGISTER.

IN the recently published volume of the Transactions of the Institution of Naval Architects there is an able paper of considerable interest on Lloyd's Yacht Register, by Mr. Dixon Kemp, who is so well known in the yachting world. The paper is really a history of the establishment of the Register, and a very brief notice of it may, we think, be combined advantageously with some remarks upon the published rules for the building and classification of yachts.

It is only when figures are given that one can realize the immense increase in this description of shipping of late years.

The number of yachts of over ten tons stand as follows:—

Year.	No. of Yachts.
1812	50
1850	400
1864	650
1878	1400

The early yachts were built to some extent in imitation of Revenue cruisers not only in design, but also in respect of the quantity of timber put in them, and consequently they were very

durable, as is shown by the fact that some produced in the first years of yacht-building are now in existence, and even in racing condition.

When, about the time of the first Great Exhibition, yacht racing came into fashion, this state of things began to be altered, owing to several causes. Racing yachts were built as light as possible in order that they might carry large quantities of ballast, and this, as well as other faults of construction, was also encouraged by the rapid increase in the taste for yachting, and the consequent demand for yachts. This great demand caused an increased supply, and a lowering of the quality of the article in consequence of the increased competition. The scantlings of timbers and planks were cut down to the barest minimum, and, perhaps, worse than all, inefficient fastenings were used in place of the old system of through bolts at the important parts of the structure. Mr. Kemp also refers to another evil feature in the designs of yachts brought about by the great rise of floor in craft built primarily for racing. It was mostly impossible, or perhaps we may say very difficult, to obtain suitable timber sufficiently curved to form the ordinary floor timber, and of the various plans adopted in construction as substitutes for it, some, either from want of skill in the builder, or perhaps owing to the desire to produce a cheap article, have been very inefficient. The lower timbers of the frame in the plan alluded to, should heel against the keel, but at the extreme lower end a rabbet should be taken out of the latter and the timber cut off to fit the rabbet, so that when the vessel took the ground the strain upon the keel would be backed up by the frame timbers. To provide for transverse connections iron floors or crutches should cross the keelson, and have their arms fastened to the frame timbers by through bolts. The timbers should also be well bolted to the keel. Sometimes there has been no rabbet in the keel for the heels of the timbers, and in other ways the elements of good work have been disregarded. We have gone into some little detail in this case, because we think that Mr. Kemp clearly makes out his point that there has been much carelessness and scamping of work in recent yacht-building, and consequently there is the greater necessity for the intervention of some such impartial

body as Lloyd's, whose certificate will be a guarantee to intending purchasers of yachts that they get what they pay for.

Lloyd's rules for the building of ships which have served as a standard of reference for wooden vessels generally, were not used much by yacht-builders; they would, it was thought, have given results as much above what was necessary as the too common type of yacht was below, and Mr. Kemp states that previous to 1877 only twenty wood yachts were classed at Lloyd's. He further tells how, in 1876, Mr. Harvey, the well-known yacht-builder of Wivenhoe, suggested to him the desirability of having a register of yachts which should secure the adoption of such rules as to the dimensions of the timbers, &c., the fastenings, quality of material, and general character of the work as appeared necessary, and should also provide for the inspection of the work by practical surveyors. This led to the formation of a committee, and preliminary steps had been taken for the formation of a Yachting Register, when the authorities of Lloyd's Register took the matter up, and offered to undertake the work of preparing rules, surveying the vessels, and preparing the register.

This action of Lloyd's ensured the success of the scheme. It was not a very difficult matter to prepare suitable rules for yacht-building. It is always much less difficult to make rules for anything than to cut rules down to the minimum necessary to secure efficiency, without imposing fettering restrictions. The great difficulty, however, which any yachting registry would have had to grapple with, and which probably would have altogether precluded success, would have been the obtaining of a staff of efficient, trustworthy, practical, and at the same time practicable surveyors, such as were secured for the register by Lloyd's. That body having taken up the question, there could be little doubt of success if yacht-owners and honest yacht-builders were at all alive to their own interests, and Mr. Kemp tells us that in the first year of the existence of the new Register, one hundred yachts were classed in it.

In framing the rules, or as they are called, the suggestions for the building of yachts, the committee of Lloyd's have, to a very large extent, gone upon the old lines of their well-known rules for

the building of merchant vessels, modifying and adapting them to meet the distinctive peculiarities of pleasure craft. The scantlings of ordinary wooden vessels built to class in the register are determined by the register tonnage under the deck, or in other words, by the cubic contents of the interior of the vessel. In the new Register for Yachts, the scantlings, &c., are based upon the tonnage as determined by the Thames Yacht Club Rule, which is as follows:—

"Subtract the breadth from the length, and multiply the remainder by the breadth, then by half the breadth, and divide the product by 94."

The length is from fore side of stem to after side of post at the upper deck, the breadth is the extreme breadth of the vessel.

Much may be said in favour of this rule as regards its use in determining time allowance, and it is certainly better for the purpose than register tonnage. A vessel's capacity for sail power to a large extent depends upon her length, and also upon her stability, which last depends very much upon her breadth. There is, however, another consideration, and that is, that most racing yachts carry large quantities of ballast often in the shape of iron floors, or keel, and the value of ballast depends upon the depth at which it can be placed. Probably a rule which would best take in the three elements upon which sail power depends, and at the same time have the merit of simplicity, would be to take the product of length, breadth, and mean draught as the basis of time allowance. This, however, on account of want of fixity in the last-named factor would not give an appropriate tonnage for building, and on the whole we think that the product of the three principal dimensions, length, breadth, and depth of hold, which is really a measure of the size of the vessel, would be a better basis for scantlings than the rule adopted by Lloyd's. It certainly would not tempt yacht-builders to design vessels with a view to getting the largest possible tonnage with the smallest expenditure of material, as will be the case when they are intended to be sold upon their yachting tonnage, the practical result being mere skimming dishes.

The rules for the building of yachts are, as we have said, based upon the rules for the building of ordinary vessels. They are of

course graduated more closely in the case of small vessels, and provision is made for craft as small as 15 tons. It is also supposed that they provide for lighter scantlings than would be required for cargo-carrying vessels of the same sizes. In order to ascertain the extent of the reduction in the scantlings, it is necessary to allow for the difference between yachting and register tonnage. Taking a number of fairly representative vessels, we have found the former to average an increase of more than fifty per cent. upon the latter. Allowing for this, it would appear that a vessel built to class as a yacht would have scantlings 5 to 10 per cent. less than if she were to class in the large register, the metal fastenings would be about the same, but the treenails would be smaller, and the equipment of ground tackle would be some 25 per cent. less. This all is, we think, as it should be, and the committee and chief surveyors of the register have, in framing the new rules, to our thinking done their work carefully and well. There is, however, one suggestion which we would make, and that is, that it would be desirable to class yachts not only by terms of years depending upon the kind of material, but also to give higher classes for an increase in scantlings; perhaps a lower class also for reduced scantling. The durability of small craft depends upon the thickness of plank, &c., to a much greater extent than is the case with large vessels, and in Mr. Kemp's paper, he very properly enlarges upon the extreme durability of the earlier and more heavily-built yachts. While we are of opinion that vessels built under the new yacht rules will be strong and seaworthy, we also think that many yachtsmen would desire to have vessels of heavier construction, and likely as a consequence to require a smaller expenditure when after the expiration of their first class they come on for continuation. Lloyd's class will be a standard of value; might it not be made to express the differences in value of light and heavy construction as well as mere difference of quality of timber? As a matter of fact we may say that most of the builders of small wooden vessels, who have a good reputation, have for years past put larger timbers and thicker plank into their vessels than are required by Lloyd's rules, and such a desirable course would be encouraged in the case of yachts, by special classes being given

to express the increased value. A lower class of lighter build also might be provided to meet the case of mere racing vessels.

The rules for iron yachts are not based upon tonnage, but are the same in principle as those given in Lloyd's Register for other iron vessels. In these vessels also we think the committee would act wisely by giving distinctive marks to vessels with thicker plating, and consequently greater durability. The smaller classes of yachts will have plating less than a quarter of an inch thick; this allows but a very small margin for deterioration, and although vessels so built may answer their purpose very well for a time, an increased thickness of plates would make the yacht really much more valuable, and consequently should, we submit, be provided for by a distinct class.

Rules are also given for the building of composite vessels, a type which, although not much in favour for general purposes on account of their dearness, are yet well adapted for the larger pleasure vessels designed for long cruises in distant parts of the world where there are no facilities for docking.

On the whole we think the new Rules and Register for Yachts cannot fail to be a great boon to yachtsmen, and will be of great value in effecting many desirable improvements in the construction of yachts.

THE IMPROVED ASPECT OF TRADE.

AFTER the unvarying lamentations that have been raised during the last three or four years over the general depression of British trade, the evidences of reviving prosperity which are at length making themselves manifest can hardly fail to be acceptable. The cry of "hard times" was becoming somewhat monotonous, and the announcement that there is at last a slight break in the clouds is being listened to by most persons with feelings of relief. Already the voices of those well-meaning individuals who proposed to save the country from absolute ruin by preventing it from purchasing cheap

foreign goods are becoming hushed in silence. Their idol, Reciprocity, is being dragged back into obscurity, and, unless our hopes are being falsely raised, it will probably remain invisible for a lengthened season. This Reciprocity bogus, by the way, seems to play the part of a forlorn hope—to be produced only as a last resort. Its admirers would appear to have no faith in its power to add to the country's prosperity in prosperous times, but rather to believe in it as a safeguard when collapse seems to threaten. However, as it has vanished for the present, it would be a mere waste of words to discuss its supposed virtues.

During the last two months the country has shown unquestionable signs of returning commercial activity. There has been a considerable increase in railway traffic, and in the general export trade, whilst wages and wholesale prices have shown a strong upward tendency. And it must be remembered that these facts are especially significant at the present time, for even the most sanguine individuals would scarcely have anticipated that any improvement would take place as it were simultaneously with the heavy losses sustained by the country through the late adverse season. The amount of wealth that has been completely annihilated by the exceptionally wet summer of the present year must be something enormous. In the agricultural districts large numbers of persons have been completely ruined, while still greater numbers have been brought to the verge of bankruptcy. And all these losses signify so much deducted from the general capital and the general spending power of the community. Yet in spite of this heavy call upon the national resources, there is, as we have already pointed out, good reason for anticipating a return of prosperity.

The October lists of imports show that articles of a total value of £32,316,000 were brought into the country during that month, as against £29,582,000 for the corresponding month of 1878; and as the same return shows that the total value of imports for the ten months ending 31st October, 1879, manifests a falling off of £20,835,000, compared with the value of the imports for that period in 1878, these figures show that the import trade must have received a considerable impetus since the earlier months of the present year. But of course it is to the exports of British

manufactured articles and minerals that we must look for the most trustworthy evidence as to the revival of our general trade. The total value of the exports of British produce during the ten months ended 31st October, 1879, shows a decrease of £4,317,000 when compared with the value for the same ten months in 1878; but as the value for the month of October, 1879, is nearly £444,000 in excess of that for October, 1878, it is evident, as in the case of the imports, that since the commencement of the year matters must have changed for the better to a very considerable extent. The following are the figures for the principal articles of export for the month of October both in 1878 and in 1879:—

	October, 1878.	October, 1879.		
Coal, coke, &c.	£611,000	£638,000	Increase	£27,000
Copper	262,000	307,000	"	45,000
Cotton manufactures ...	4,718,000	4,748,000	"	30,000
Hardware and cutlery ...	313,000	268,000	Decrease	45,000
Iron and steel	1,698,000	2,027,000	Increase	329,000
Linen manufactures ...	414,000	419,000	"	5,000
Machinery and millwork ...	503,000	558,000	"	55,000
Silk manufactures	163,000	128,000	Decrease	35,000
Telegraphic wires & apparatus	30,000	412,000	Increase	382,000
Woollen manufactures ...	1,332,000	1,292,000	Decrease	40,000

With regard to the shipping trade (foreign) the returns are as follows:—

	October, 1878.	October, 1879.	Increase.
Tonnage entered ...	1,992,297 ...	2,038,732 ...	46,435
" cleared ...	1,910,606 ...	2,137,295 ...	226,689
		Total	273,124

Between the return of tonnage (both entered and cleared) for the ten months ending 31st October, 1879, and that for the same period in 1878, there is a curious coincidence, the difference between the two being only 109 tons. The following are the figures:—36,563,170 for the first ten months, 1878, and 36,563,279 for the ten months, 1879. Of course this is nothing more than a chance agreement, but, happening as it does among figures of such vast extent, it is worthy of note.

In the home and coasting trade we find an increase of 148,000

tons in the tonnage of vessels entered, and of 115,000 tons in that of vessels cleared during October, 1879, as compared with October, 1878. This gives a total increase of 263,000 tons (entered and cleared) for October, 1879.

On the whole the returns seem fairly to indicate a probable return of more flourishing times. It would be rash, however, to anticipate anything like a sharp revival of general industry. The depression from which trade has been suffering during the last four years did not occur suddenly. On the contrary, it commenced almost imperceptibly, and gradually increased up till within about two or three months since. It is too much, therefore, to expect that an evil which has grown so slowly and surely is about to be abruptly conjured away. Whatever may be the favourable influences at work, it is quite certain that they will be nullified to some extent by the heavy losses to which we have already referred. But of course, if the outside demand for British produce continues to increase, these losses will speedily be made good. For after all it is the foreign trade that constitutes the main-stay of British prosperity. There is good reason to believe that the small revival which has just taken place is due, to a considerable extent, to a return of more prosperous times on the other side of the Atlantic. When speaking of the unsatisfactory condition of trade in May last we had occasion to refer to the state of stagnation into which American commerce had fallen, but there are now fair grounds for hoping that the worst period has been passed by the United States as well as by our own country. The Americans have been favoured with a succession of abundant harvests, their commerce generally seems to be reviving, and as a natural consequence they are once more coming forward as purchasers of British manufactured goods.

For some time past the advocates of reciprocity have been threatening us with an influx of American "protected" iron and hardware, but, like the showman's donkey that was always about to ascend the ladder, but which always remained on *terra firma*, these articles never seem to arrive upon our shores. The fact that hardware to the value of £277,000, and rail-road iron to the value of £150,000, have been sent from this country to the States during the first ten months of the present year, will prove

rather a poser for these gloomy prophets to explain. With regard to the railway iron, there has recently been a tremendous bound in the quantity sent across the Atlantic, no less than 31,989 tons having been exported to the States during the month of October, whereas the weight exported there in October, 1878, was only 911 tons.

It is tolerably certain that the great advances that have recently taken place in the wholesale prices of many staple commodities, are not to be attributed entirely to the improved condition of general trade. In some instances, these advances reached twenty, thirty, and even fifty per cent. in the course of a few weeks, thus showing that they were caused by speculative transactions rather than by a genuine increase in demand; and, of course, in some cases, the falls were equally rapid. These fluctuations have doubtless arisen from the abundance of money, and the eagerness of speculators to take advantage of the first indications of returning activity, by purchasing heavily in view of a probable improvement in the actual demand. They may therefore be regarded as the aggravated or intensified symptoms of a genuine revival.

On the whole the present prospect, so far as it can be judged, is decidedly encouraging. It is too much to expect that the prosperity which existed four or five years since will return with a bound; but that it will eventually return there is no reason whatever to doubt. There has been no change in the general condition of things that would justify a belief to the contrary. England still possesses all the natural advantages she has hitherto possessed; and Englishmen have not as yet been outrivalled in energy and industry by the men of any other nation. In some instances, it is true, other countries are doing their best to prevent us from supplying them with our goods, but the markets that are still open to us, and the markets that have yet to be opened, are practically without limit. Vast tracts of country are waiting colonization. China is even now an almost untried field—while the resources of India are not as yet more than half developed. If all the "unprotected" and possible markets for our wares had been thoroughly opened up and "protected" against us, Englishmen might have reason to look forward with some degree of doubt

as to their country's commercial future, but at the present day this is a contingency about which none of us need trouble our heads. For, long before it can come to pass, the present generation will be forgotten. It is not surprising that our merchants should feel somewhat sore at finding one after another of the older markets being more or less closed against them; but they may derive a certain amount of consolation from the fact that the nation which fosters high prices at home by means of protective duties renders itself powerless as a competitor for custom in the open market—unless, indeed, it chooses to saddle itself with a bounty system, as France is doing in the case of the sugar trade at the present time. But in these days this is a system which is decidedly too preposterous to become general.

COAL CARGOES.

(*Communicated.*)

IF the two articles on Coal Cargoes in the *Nautical Magazine*, of June and August last, had done no more than elicit the impartial editorial exposition and critique devoted to the subject in the October number, they have done good service to all parties interested. That exposition places at once in a clear light the leading features of the discussion; gives due weight to the value of the recommendations of the Royal Commissioners; and correctly explains the real object of the two articles in question, rightly divining that they were not intended either to misrepresent or detract from the soundness of the conclusions arrived at by the Commissioners, or question the importance of the precautionary measures suggested by their report, which cannot be too highly valued or too strictly enforced whenever the cause of danger to be guarded against exists.

It is true that in those articles it is contended that ventilation is no cure for spontaneous combustion, but that fact is not controverted. It is also true that, without denying the value of surface ventilation where it can be properly applied and maintained, it is

contended that it is not a certain and unfailing remedy against explosion. These conclusions are abundantly borne out in fair argument by the returns called for by Mr. Childers.

Undoubtedly the main object was to suggest that a more certain remedy was to be found in the use of a prepared fuel, or coal divested of its deleterious gases. The surest preventive of the deadly effects of the venom of the serpent's bite is the extraction of the poisonous fang. If the suggestion were well founded it deserved encouragement; if otherwise, it was open to the Wreck Commissioner to show reasonable grounds for its repudiation. The first article was before the world for two months before the Wreck Commissioner discovered the alleged misrepresentation of the Royal Commissioners' report; but no sooner did the force of remonstrance and exposure, provoked by its intermediate disparagement and misquotation and the imputation of unworthy motives, come home to him, than he gave to the article an interpretation adverse to the views of the Royal Commissioners, which was followed, it is assumed, on the faith of his version of the facts, by the interrogatory in the House of Commons. One hardly knows which to admire most, the sublimity of the Wreck Commissioner's virtuous indignation, or the opportune discovery of the very ingenuous construction which inspired it. But most assuredly the true meaning of the article he perverts is so palpably incompatible with any sentiment of disrespect towards the Royal Commissioners, or depreciation of their report, or recommendations, that further disavowal of any such intention would be supererogatory.

If the Wreck Commissioner, or whoever may have been responsible for the grave misapprehension and confusion which have been imported into this controversy, had appealed directly to the Editor of the *Nautical Magazine* for permission to reply, or sent explanation through its pages, he must have known that the columns of that journal would have been open to him. At all events, there would have been no necessity for evoking the formal interference of Mr. Childers, or the attention of the House of Commons for such a purpose, until he had applied and been refused.

It cannot be satisfactory to Mr. Childers to find that the alleged misrepresentation for which he sought intervention at the hands of the President of the Board of Trade, was only the emanation of his informant's brain.

The object of the Royal Commissioners was to devise the best means of preserving coal cargoes from the calamities to which they are so much exposed. The express intention of the articles complained of was to attain the same end still more effectually by suggesting the shipment, instead of the raw produce of the mine, of a preparation of coal from which the cause of danger is eliminated, whereby even the remedial measures proposed, difficult as they confessedly are of application in many cases, would be rendered unnecessary. He who seeks to disparage such endeavours may undoubtedly rest assured that he much misapprehends the enlarged views and philanthropic aspirations of the Royal Commissioners, if he thinks he should be gratifying them by stifling the discussion of suggestions for the better prevention of accidents at sea, although, if well founded, they might render the adoption even of their recommendations needless. Mr. Childers and his colleagues would be amongst the very last to repress the consideration of such suggestions. In one sense, however, this interlude need not be regretted, the resumption of the subject from time to time being beneficial, whatever the motive or incitement for re-opening the discussion. Much has been done towards enlightening the public mind on the matter, which is of too much importance to be shelved, of too serious a nature to admit of the facts or arguments on either side being misrepresented with impunity, and too urgent to be allowed to drop or be abandoned in the face of continually accumulating evidence of the fatal consequences of inefficient precautions for the safety of coal-laden ships. Indeed, whilst the pen is actually employed in committing these lines to paper, the telegraphic wire flashes the painful tidings of an explosion of gas from Abercarn coal, on board a vessel in Newport Docks on the point of sailing, by which the crew were seriously hurt, and the craft much damaged. This is but a repetition of similar warnings such as the recent explosion on board the *Pretoria* in the Southampton Docks, one day only

after coaling, by which one man was killed and seven seriously, if not in some instances, fatally injured. This case is selected as a parallel to that of Newport, because, in both, the calamity ensued so quickly after shipment of the elements of danger, that the necessity for previous elimination of these dangerous properties, instead of leaving all to the doubtful expedient of ventilation, receives from it abundant confirmation, doubly corroborated by the statement that the bunkers of the *Pretoria* were "well ventilated."

Admitting the value of ventilation where it can be successfully employed, here are two more cases in which the catastrophe followed so speedily after the shipment, as scarcely to have allowed time to make the experiment of its adoption; and in the one in which it is reported that time had permitted good ventilation, it did not prevail against the swift messenger of death and destruction. Again, it may be argued that although the *Pretoria* is said to have been "well ventilated," it was not done upon a good principle, and true it is that various opinions are entertained as to what is the legitimate method of securing safety by such means. Even where a generally approved system is adopted, that for instance of surface ventilation, aided by down draft, with cowls fore and aft; the use of such means of safety is not infrequently abandoned in rough weather, the very time, perhaps, when from the disturbance of the coal and the liberation of the gases, it might be most needed. Life and property in coal-laden ships never can be deemed secure when the precautionary measures provided may in certain conditions of weather be rendered of no avail. When men are killed or crippled for life, the damage is irreparable, but, irrespective of that, the cost which ensues from these disasters must fall heavily on some one, whether for demurrage pending refitting, replenishment of bunkers, repairs to ship if not damaged beyond reparation, or total loss of ship and cargo at sea.

The pecuniary consequences resulting from the lightest of these calamities would in most cases probably more than counterbalance the expense of converting the cause of the catastrophe into harmless fuel. Such considerations as these alone would seem to afford an adequate inducement to the shipper, the owner, the underwriter,

and indeed every one interested in the property at stake, to lend a willing and impartial ear to any suggestion having for its object the safety of sea-going ships. But when the question of human life is concerned, no paltry pecuniary considerations ought to weigh for one moment against the adoption of any reliable expedient for its preservation.

Assuming then that a fuel can be produced in sufficient abundance, and at a cost not prohibitory, from which neither spontaneous combustion nor explosion need be apprehended, ought not its use to be encouraged? At all events ought not the freest discussion of such a question to be courted, and its merits carefully tested and candidly considered instead of being discountenanced, or its advocacy attributed to self-interested or unworthy motives?

Nothing could be more just than the editorial comment of October last, which affirms it to be the duty of the Wreck Commissioner to make an example of any one who tries to evade responsibility under the subterfuge that a writer in the pages of the *Nautical Magazine*, or elsewhere, has said something inconsistent with the recommendations of the Royal Commissioners. It is equally true that he ought not to stifle discussion in regard to any suggested remedy against disasters of coal-laden sea-going ships which its advocates honestly believe to be calculated to afford reliable security.

It must not, however, be inferred from the foregoing that the truth and force of the facts and arguments adduced in the two articles to which reference has been made are in any way shaken.

If such an impression prevails it is important to disabuse the public mind lest an all-important question should suffer. It is a subject which ought to be impartially deliberated upon in all sober earnestness. It is essential that the virtues of patent fuel should be attentively considered by all parties interested, and it is satisfactory to know that the prejudice against it has considerably abated of late. Coal owners are beginning to realise the fact that, instead of damaging their market for large coal, consolidation of their small coal into convenient sized blocks will constitute a very valuable acquisition to their trade. Evidence of this is to be found in the fact that the coal owners themselves are now largely engaging in

fuel making, amongst whom may, appropriately to the matter in hand, be mentioned Lord Londonderry, whose preparations, now in progress, have for their object the manufacture of fuel for the bunkers of his lordship's steamers.

If coalowners in preparing fuel for sea-going purposes will only take care that the process is such as to secure its freedom from the dangers to which the raw material from the mine is liable, they will find their reward in remunerative orders from shipowners, and in the gratitude of seafaring men.

THE MOVEMENT IN SHIPBUILDING.

IT is with much satisfaction that we are enabled to chronicle the fact that the shipbuilding enterprise of our country appears to be under the influence of a healthy impetus.

The following particulars respecting new vessels recently built, or about to be put in hand, afford assuring evidence of a decided improvement in the trade.

THE S.S. "ORIENT."—The Orient Steam Navigation Company (Limited), represented by Messrs. F. Green & Co. and Messrs. Anderson, Anderson & Co., as managers, having for some time successfully run a line of powerful steamers to the Australian Colonies, *viâ* the Cape of Good Hope, and home through the Suez Canal, the voyage each way being accomplished, as a rule, in a few days over mail rates, having determined to place an additional vessel on their line, contracted for the s.s. *Orient*. This new steamer has been built by Messrs. John Elder & Co., and is not only the largest vessel which the Glasgow shipbuilding yards have turned out, but is only surpassed in size among passenger vessels by the *Great Eastern*, built in London, and by the *City of Berlin*, built at Greenock. The *Orient* is the first the Company have built for their line. She has a displacement at her load draft of 9,500 tons. Her registered tonnage is 5,400, with engines of 5,400 horse-power, giving a computed speed per

hour of 15½ knots. Her principal dimensions are, length 465 feet, breadth 46 feet, and depth 37 feet 8 inches. She has been equipped beyond the requirements of her class, 100 A1, the highest at Lloyd's, and has satisfied Government inspection as regards her defence by means of water-tight compartments and coal bunkers, so that she would be available, if requisitioned, in time of war, as a cruiser or troop-ship, for her coal bunkers are so placed as to protect her engines, while they carry coal enough to keep her at sea, steaming full speed for 40 days, and she could not be sunk by penetration of less than three of her water-tight compartments.

The *Orient* is barque rigged with four masts, three iron decks, and is divided into thirteen watertight compartments, by bulkheads, while, as a security against fire from the lower to the main deck, she is divided into six compartments by five fire-proof bulkheads, fitted with fire-proof doors.

There are berths for 120 saloon, 130 second saloon, and 300 steerage passengers, while the lower deck will, if required, accommodate 1,500 troops, and the orlop deck 300 to 400 horses. The chief saloon is as nearly as possible in the middle of the ship, in order that the movement of the vessel shall be felt as little as possible, and is 44 feet square, going from side to side of the ship, and unusually lofty. The chief saloon passengers have a promenade deck of 160 feet long, and the whole breadth of the vessel for their exclusive use; whilst the interior fittings of the dining saloons, music saloon, smoking rooms, and passengers' cabins are of a most elegant description.

The vessel is fitted with patent hand and steam steering gear, steam windlass, five powerful steam winches, two condensers for supplying fresh water, eight large lifeboats, and two life-rafts; punkahs worked by steam in the chief dining saloon, pneumatic bells to all saloon state rooms, speaking tubes and telegraphs to all parts of the vessel. Automatic ventilators, working by the motion of the vessel, are fitted up, in addition to an unusual number of ordinary cowl ventilators. There is a large water ballast tank fitted up aft, which can be filled from the sea as coal is consumed; this is a necessity, as nearly 3,000 tons of coal will

be consumed on the voyage. The *Orient* was launched on the 5th of June last; the trial trip was altogether successful, and when brought round to the Thames the owners thoughtfully threw her open for public inspection during four days, in aid of the funds of the various hospitals and asylums devoted to seamen in the vicinity of London. On going round from Gravesend to Plymouth she averaged 14½ knots, and she started thence for her destination at 2h. 30m. p.m. on 6th November, in the expectation of reaching Australia in 36 days.

THE S.S. "NORFOLK."—There is another fine line of vessels that has been established for years, and was notorious in days gone by for the quick passages of the old *Kent*, *Norfolk*, &c. (sailing ships): we mean Messrs. Money Wigram, and Son's line, well known in the Australian trade. After a time they went into steam, and have been very successful in their ventures. Their last steamship (the *Norfolk*) is an improvement on all they have hitherto introduced on the Australian route. The *Norfolk* is the second largest merchantman built on the Thames; and though built by Messrs. Green, of Blackwall, she was designed and constructed under the especial supervision of her owners, whose own works have now been absorbed by the Midland Railway as a goods terminus and place of embarcation. The *Norfolk* is what is termed a three-deck ship, differing from the ordinary spar-deck vessel. She is constructed on the girder principle, and of enormous strength, having floors of considerable depth and thickness. Her masts are of iron in one length, with yards of steel. Her cabins, in which particular attention has been paid to providing for superior ventilation, are very spacious, giving accommodation for about 500 passengers, in addition to which there is room for about 2,000 tons of cargo, and 1,300 tons of coal. Her dimensions are as follows:—Length (extreme), 345 ft.; breadth, 40 ft. 1 in.; depth of hold from main deck, 32 ft. 9 in.; height, between decks, 7 ft. 9 in.; tonnage, 3,000 register. Her engines have been fitted by Messrs. Humphrys, Tennant, and Co., of Deptford, on the four-cylinder compound principle, of 500 horse-power nominal, capable of working up to 3,000 horse-power. Two of the cylinders are 31 in. bore, and two 76 in. bore, with a 4 ft. 3 in. stroke. The

result of her trial was very satisfactory, averaging over 15 miles per hour under 70 lbs. pressure, and making 62 revolutions per minute. She started for her first voyage on the 18th of October.

THE "SAHARA."—The Cunard Company have a large and important fleet trading to various ports, but are best known by their Atlantic line, and for the latter they have now resolved to construct a steam vessel of great size and power, of which Mr. John Burns writes as follows:—My partners and I have just concluded a contract with Messrs. James and George Thomson by which that firm is to build on the Clyde, for our fleet, a screw steamship, the size of which will be exceeded only by that of the *Great Eastern*, while the speed will be greater than that of any ocean steamer afloat. This new vessel will be of 7,500 tons, and 10,000 horse-power, her dimensions being 500ft. in length, 50ft. in breadth, and 41ft. in depth, propelled by inverted direct-acting compound engines, with three cylinders and seven oval tubular boilers, having 38 furnaces and 1,000 ft. of effective fire-grate surface. She will have an extra promenade deck, and will practically be a five-decker, being fitted for 450 first-class and 600 steerage passengers, with accommodation for a crew of 200 officers and men. Her cargo capacity will be equal to 6,500 tons, with 1,700 tons of coal and 1,000 tons of water ballast, having a double bottom on what is called the "longitudinal and bracket system." This vessel has been designed, after lengthened consideration, to meet the requirements of our trans-atlantic service, and we have adopted in every detail of the ship and engines the most advanced scientific improvements compatible with the safe working of so great a vessel. Among the important matters into which we have crucially inquired has been that of the employment of steel instead of iron, and after a practical and thorough examination into the merits of both materials, we have adopted steel for the hull and boilers, but under a provision so stringent that every plate before acceptance will undergo a severe and rigid test by a qualified surveyor. The steel is to be made on the Siemens-Martin process, and all rivets as well as plates throughout the ship are to be of steel. The name of the new vessel is to be the *Sahara*, and she is to be ready for sea in March, 1881.

The "PARISIAN."—Whenever size, speed, and efficiency are in question the Allan line will be sure to be to the fore, and it appears that they also have given an order for the construction of a large passenger steamer of 5,500 tons, to be called the *Parisian* ; the contract has been placed with Messrs. Napier, of Glasgow, the celebrated shipbuilders and engineers. The *Parisian* will be built of steel, made on the Siemens-Martin principle, and the material to be used in construction will be subjected to the most rigid tests both by Lloyd's and by the owners' own surveyor. The steamer is to have a double bottom on the same system of construction as was introduced by Messrs. Allan in their new cargo steamer *Buenos-Ayrean*, now nearly ready for sea, and which is also to be adopted in the New Cunard steamer *Sahara*. The design and specification of this magnificent addition to the Allan fleet embrace every ascertained improvement likely to secure safety, efficiency, and comfort at sea; and the *Parisian* may be expected to take her place among the other well-known steamers of the line in April, 1881.

In addition to the foregoing, we may state that the Compagnie Générale Transatlantique, one of the largest French steamship companies, has lately given an order for the construction of several large steamers to four English shipbuilders. The steamers are intended for the development of communication between France and Algiers, and are of 2,000 horse-power, fourteen knots, and fitted up with every requisite for a large number of passengers, and for carrying the mails. The order has been divided amongst the following firms:—John Elder & Co., of Glasgow; Wigham Richardson & Co., of Newcastle-on-Tyne; Caird & Co., of Greenock; and A. and J. Inglis, of Point House.

It is not surprising that this fact has caused some excitement among French shipbuilders, which has elicited an interesting explanation from the president of the Compagnie Générale Transatlantique in reference to the circumstances under which the order was intrusted to English instead of to French hands. The president says that the vessels were required to be delivered in eight months, and when estimates were invited from the principal French shipbuilders, they all, with one exception, declined to tender, on the ground that the time

allowed was too short. The Société des Forges et Chantiers du Havre et Marseilles offered to build six vessels at 1,400,000f. (£56,000) each, and to deliver the first in ten months and a half, the second in 12 months and a half, and the rest in 14 months. Fourteen English firms tendered, besides several whose offers arrived too late to compete, and four of them agreed to deliver the vessels at an average of 1,139,750f. each. This is 260,250f., or £10,410 less per vessel than the lowest French estimate, and each firm contracted to deliver the vessels within seven months and a half.

This explanation is certainly most encouraging to British shipbuilders, as showing that in the open market foreigners find it difficult to successfully compete with us. This is also borne out by another fact which has reached us, viz., that a Hamburg firm who are about establishing a new line of goods steamers from Hamburg to New York are now having two steamers built in England.

Thus far we have referred to vessels of large size and power for oceanic navigation, but there are rivers and estuaries in well populated regions where *steamers of light draught* are required for the transport of passengers and goods, and for the conveyance of mails. These are no less important in their place than the larger craft, and many such have been built on the Thames. Messrs. Yarrow and Co., at Poplar, may be mentioned as having ready for despatch two steamers of somewhat peculiar construction, built for the conveyance of mails on the river Magdalena, in South America. The United States have hitherto obtained most of the contracts; but about two years ago Messrs. Yarrow and Co., sent out a steamer 100 ft. long, having a draught, with steam up, of only 12 inches. Last year there was less water than usual in the river, and this little steamer was the only one out of nearly thirty with which communication could be maintained between the capital in the interior and the sea-coast. The owners, in consequence, obtained the contract for carrying the mails, and immediately ordered two more steamers of similar construction for this service. In making the engines, advantage has been taken of the experience gained in the manufacture of torpedo boats, of which Messrs.

Yarrow and Co. have made many. To secure lightness, hulls, engines, and machinery are as far as possible made of steel. The engines are on the compound surface condensing system; but, as there are rapids in the river, provision has been made for working the engines for a short time at high pressure. The boiler, which is placed at the bows on the main deck, resembles an ordinary locomotive-boiler; but since wood, and sometimes damp wood, will have to be used as fuel, there is a fan and a small fan engine to blow air into the fire-box. The air forced in will be drawn from the saloon, so that a perfect system of ventilation will be established—a matter of no little importance to the comfort of the passengers in a hot climate. It will also be possible to attach to the fan a circular saw for cutting up the fuel. The condensers and the other portions of the machinery are placed on the main deck at the stern. The cabins for first-class passengers are amidships on an upper deck, and over this is a third deck with the pilot-house and a few more cabins. The weight of the machinery being distributed and placed at either end, the builders were able to vary the principles of construction, with the result of considerably decreasing the weight of the steamers. They are 130ft. in length, 28ft. beam, and the draft with steam up, but without cargo, is 12in., and with 90 tons on board the draft would be only 2ft. Below the main deck the hull is divided into 18 small watertight compartments, and should any one of these be injured, a centrifugal pump on deck and a long suction hose afford an easy means of pumping out the damaged compartment. The steering, managed from the pilot-house on the top deck, is effected by means of three rudders, the centre one being balanced as in some of the torpedo boats. As other similar steamers built by this firm have had a speed of 12 to 13 miles an hour, it is expected that with the improvements made in these two vessels, they may be driven on a continuous run at a rate of 15 to 16 miles an hour.

We learn also, with much satisfaction, that the Americans are also congratulating themselves upon a return of activity in the shipbuilding industry of their country. The *Boston Commercial Bulletin* says that " the American shipbuilding interest has already revived to a marked extent during the past few months. A *New York Tribune* reporter, who has made a tour among the great iron

shipbuilders on the Delaware, gives a very gratifying picture of the activity which has recently set in. At the works of John Roach and Sons a much larger force is employed than fcr a long time past. This yard has turned out eight first-class ocean steamships since the 1st of January, and has recently completed a large sectional iron dry-dock for the Pensacola Navy Yard. Orders for new work have been coming in very freely lately. At the shipyards of Cramp and Sons they are now at work on some of the largest coasting steamships ever constructed. The great yards at Wilmington are at work on some first-class iron steamships for the South American trade, besides a great number of steamers for the inland and home coastwise business. The engine-building works are all actively employed. Nearer home the same improvement is noticeable. The shipyards at East Boston and in Essex County have recently completed some first-class sailing vessels for the fruit trade. The demand for handy-sized coastwise vessels is better than for some time past. The Maine yards are getting more orders. There is no 'boom' yet in the shipbuilding interests, but a legitimate and steady improvement has set in. All that is wanted now is that Congress shall abstain from hasty and uncalled for interference with the arrangements upon which the prosperity of the industry rests."

We echo this last sentiment, and trust that the British Parliament will also do nothing under the influence of one-eyed enthusiasm to hamper the free development of one of the main features of British commercial industry.

A CONTRIBUTION FROM AN OLD FRIEND.

II.

ONE of the most desirable qualifications in an officer, is the faculty of *suitably* apportioning his men, time, and material to the *needful* work. This can only be acquired by a strong conviction of the *truth* that our own true interests are identical with those of our employers, and continually planning and devising how to obtain the best possible result with the least expenditure of time and stores.

Captain Marryat, in one of his novels, teaches us the best time to do this. He makes one of his young officers wile away the tediousness of night-watches by placing himself in imaginary (but probable) dangerous situations, and *thinking out* the best possible means of extricating himself. It is a happy thought, but, like many such, will present itself spontaneously to those most likely to take advantage of it; while those who would most benefit by utilising it, will probably not see the necessity for doing so.

The officer who so employs his spare time, *must* acquire the character of a thoughtful man; and not only be cool and prepared in cases of dangerous emergency, but will have all the petty (but necessary) details of the ship's ordinary routine properly arranged and cared for. For he will soon realise that upon these more than upon extraordinary emergencies does the success of the voyage and his own character depend. The sails, by which he utilises his propelling power (the wind), will naturally receive much of his thought and attention. A good officer will be even more careful of the sails than of his own clothes, for he knows that not only the speed, but the safety of the ship, depends upon them; and that the bursting of a sail, in a critical situation, might cause the loss of his own and his shipmates' lives.

In stowing spare sails away, he will take care to see that they are thoroughly dry, and likely to remain so—scattering waste paper among them (rats will not cut sails if they can get paper for their nests).

Never allow sails on the yards, or in the cabin, to remain in a doubtful state, they mildew quickly, especially in hot weather; if you cannot get them dry, have them *aired* in time, even if you have to employ labour to do so. Spare sails should be aired frequently. Do not let your men get into a slovenly way of bending and reefing. In letting out reef, *always* settle the topsail haulyards, and ease tack and sheet of courses. If there is much wind and your sails are old, lower the yard right down and haul your courses up, if you would not have your sails burst at the reef cringles. Avoid frequently "tightening up" your square sails in the heat of the day—early morning is the proper time to do so; and even then care should always be taken *in time* to ease haul-

yards, sheets, and outhauls, should raw, cold, or wet weather unduly contract them. If this is neglected, the next hot day they will want tightening-up again, and so on until "the virtue" is out of the sail.

Jib and stay-sail sheets, in a calm or when tacking ship, are often hauled *too flat*, and the sails similarly injured or destroyed by neglecting to *ease them off* when wet. Wind, or a head sea, puts an undue strain upon them. You will soon learn which sails your ship likes and dislikes. A spanker, or gaff top-sail, carried in a vessel requiring much weather-helm, would *retard* her speed, and prevent her from wearing quickly if required.

The smaller the angle of the rudder from the line of keel, the less will it retard her progress, and this should always be borne in mind when trimming or making sail. The yards, on the contrary, will have most power when at right angles, and at no time is it advisable to have the upper yard checked in a point or two more than the lower ones, for by doing so you put an undue weight upon the upper and smaller braces, and lose power with your lower and larger sails. The yards should be so trimmed that the main-royal, or top-gallant sail, should lift a trifle before the other sails (say quarter point).

Experience teaches that courses, as well as the other square-sails, are best taken in by hauling-up the *lee* gear first, care being taken that it is *all* hauled well up before the tack is started, and leaving some hands to pull it close up while hauling-up the weather gear, which the wind will assist you to do.

In taking in royals, you can generally spare a hand or two to be aloft in readiness to quiet the sail; one hand can point the yard to the wind and spill the sail (not back it) *immediately* the lee sheet is started. Some officers spend much valuable time in doing this *before* starting a sheet, and while the weight of wind is in the sail. The same with top-gallant sails; setting all square sails exactly in the opposite manner you take them in. In taking in or setting jib and stay-sails, be careful to tend the sheet, easing the weight of wind out of the sail, but not allowing them to shake.

When, as is sometimes the case, the wind increases faster than you can shorten sail, you can haul the lee side of your courses up

in the aforesaid manner, and let them remain with the tacks fast, the weight of wind will be out of them, and they will take no harm while you are securing the lighter sails. It is sometimes advisable to keep the ship before the wind to secure the head sails, but this must always depend upon surrounding circumstances.

Riding head to wind you naturally set your head sail, and furl your after sail first, because the latter would be becalmed by the former. Not so easily acquired is the knowledge when to take sail in. In the North they say—" Any fool can carry sail, but it requires a sailor to take it in ; " and really so many things have to be considered that none but thoughtful men will attain it, and those only by long practice. The condition of the ship's hull, spars, and rigging, the nature of the cargo, the locality you are in, the meteorological signs, the efficiency of your crew, the direction of the wind, have all to be studied, in addition to the question of how much the sail will bear.

Away in the open sea, with clear weather, steady wind, and the ship's head pointing to her destination, an officer would be tempted to run a little risk, but even then it is best to err on the safe side. But with a foul wind there is no inducement to run any avoidable risk, and in squally weather, or in intricate navigation, every prudent man will have his ship well under command. An old nautical rhyme (?) teaches—

> " Rain come before the wind, take your topsails in;
> Wind come before the rain, set your sails again."

But you will seldom have the opportunity of setting the *same* sail again if you wait until the rain *preceding an arched squall* reaches you before taking them in. Commanders of great experience, with an intimate knowledge of the meteorological signs of the locality they are in, are apt (unconsciously) by their example to teach young officers to wait too long when a squall threatens. Sail should always be reduced in time, and the risk reduced to a minimum. Those officers will make the best passages that exercise the greatest care in this matter, for they will be in a position to set sail immediately the squall has passed, which is not the case with those who hold on too long. Guard against in *any way* wearing sails that are not adding speed to your ship. The sail-

maker's bill is a very heavy item in ship's expenses, and any extra care you may take to rednce it will soon make itself known in your favour.

It is not wise to cover canvas or ropes more than is absolutely necessary to protect them from chafe. Greenhide, which collects and retains water, is particularly objectionable. "A good rope will save an old sail, while a bad rope will *sell* a good one." It is never advisable to put much new canvas in an old sail; the best of condemned sails should be saved for patching them over all.

For wearing very old thin sails is like a steam-vessel using an old boiler or burning bad coal. But good sails are continually getting chafed with buntlines, leech lines, reef points, &c. And the number of the canvas with which to repair them must depend upon the size of the sail, quality of the canvas, &c.; but, as a general rule, you may put No. 2 repairing canvas in lower topsails and stormsails, though you will find that these get very equally worn and seldom need much repairing; No. 3 in courses, upper topsails, spanker, and jibs; No. 4 in topgallant sails, flying jib, gaff topsail, &c.; and No. 5 in royals and upper staysails. See that the new cloths are cut a little shorter than those they replace; the same with rope, for these will stretch, while the old sail has probably ceased to do so. See that the selvage edge of your new canvas covers the worn seam in the old (repairing canvas is made broader than long flax to allow this), and where round seams are sewn let them be in the new canvas, which will best bear rubbing down. If you do not carry a sailmaker, you will soon learn which of your men is best fitted for sailwork, and will exercise a careful supervision over canvas, twine, &c.

Equally important is it that you should take all imaginable care of your spars and rigging. Do not, for sake of uniformity in your "dead eyes," allow one shroud or backstay to bear a weight that should be divided between two or more shrouds; any extra strain will carry it away, and most probably its companions also, in which case you lose your masts. Any little want of uniformity can be remedied by putting a turn or two *in* your shrouds at the first convenient opportunity. In setting up rigging, care should be taken to give the lanyards *time to render*, and a winch should

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be preferred to a capstan, because it is a slower as well as a stronger purchase. In setting your rigging, &c., double your runner by splicing a hook into one end and securing it by a small selvage strop to the *middle* part of your lanyard, leading the other end up through a good single block on the shroud, and down (as usual) through a single block on the end of the lanyard to your "luff upon luff." This assists your lanyard to render. Set up both parts of double stays at the same time, letting them both bear alike, always taking *great care* that the lower rigging stays and backstays bear the greatest weight. Many spars are lost by allowing the royal stay or backstay, flying jibboom, guy or martingale stay, to bear the weight of the whole spars.

The fore topmast has a tendency to work forward through the extra weight of the jibs, the same with a barque's mizen topmast, and it may be advisable to set the backstays up first, keeping sufficient strain on the stays to avoid springing the mast. For the same reason the weight should be eased off fore top-gallant and royal backstays before coming up the stays to rig in your jibboom. The martingale back ropes of a long jibboom should never be set up until the middle of the boom is supported by putting a moderate weight on the inner jib stay. Many booms are sprung (and I have known them carried away) in the cap through neglecting this precaution.

Economy should be studied in refitting your running rigging, but there is no economy in wearing a brace or haulyard until it breaks, and carries away yard or mast.

Braces should always be good, but the lower top-sail braces can be worn longer than others, as it never bears much strain, and when you are close-reefed, lashing the upper and lower top-sail yard arms together will give you the upper brace to assist it.

If you carry steering sails, the upper fore-top-sail brace should be a size larger than the main. Your own judgment (if you educate it) will soon teach you to put the best rope where there is the greatest strain, and to tell when any rope has a dangerous tension. If you are earnest in your desire to acquire a valuable character, you will keep yourself acquainted with the condition of every rope in the ship, certainly of every important one; reporting

any bad wound or chafe to the captain, and not allow it to be covered up to hide oversight or neglect. Do not trust to memory, but as you make your frequent tours of inspection aloft, take a little memorandum-book with you and carefully note everything that requires altering or amending; teach your junior officers to do the same. Enter all the items in the fly-leaf of your journal or log-book, and arrange leisurely how and when they can be best attended to, striking out each item as this is done.

A thrifty officer is generally a valuable one, because he has learnt not to despise small things. You will do well to cultivate this character by preventing your men from continuing their habit of cutting seizings, rackings, clinches, &c., and seeing that all old rope, canvas, &c., is properly cared for. Be sure that in doing so you are consulting your own interest quite as much as your employer's.

The Americans and our maritime neighbours are far ahead of us in the quality and efficiency of their blocks, and find their interests advanced in being so; but you must make the best of those you have. Avoid the proverbial small block and big rope, and do not use sheaves with patent bushes; when there is a heavy strain the rollers get flattened, and will not roll. Gun-metal bushes are best for topsail, haulyard, fore and main sheets, cat and fish blocks, &c. Clean every block often, using black lead only, not grease, which only harbours dirt.

In taking out forelocks, pins of shackles, &c., have them rubbed with *coal tar*, which will prevent them from rusting, and this should be done as opportunity offers with the screw pins of all shackles, with bolts in rollers of leading chocks, and with the iron forelocks in your cable shackles; these are sometimes replaced by forelocks made of English oak or American elm, which can be bored out. The same cause that makes this necessary will impel you to see that the ends of your cables while perfectly secured are in a condition to be easily slipped.

Iron vessels generally have patent windlasses; these you should see are kept in perfect order, and that the carpenter or whoever works it perfectly understands its construction and use. The brakes require very judicious handling, and your man should be

(previously to anchoring) taught to surge the cable away gradually, as he would a rope hawser round a bitt head. Many windlasses are broken, anchors lost, and other damage caused by bringing the ship up *all standing*. Never allow the nipper to be put on the cable abaft the windlass without orders from captain or pilot, who will generally make your task easy by stopping the ship's way before letting go the anchor.

Your steering apparatus will likewise demand a portion of your attention. If it is a screw or worm, you will find that the rudder, deprived of the support afforded by tiller ropes or chains, will soon wear loose in the gudgeons, and acquire a really alarming motion. This can be mitigated by using an endless tiller rope. Put two single blocks on the tiller, two on the standards (or bolts) in the side provided for relieving tackles, and a piece of half-worn rope, the middle of which should be in midships, the ends secured on their respective sides after reeving them in the blocks; this should always be done when riding in rough water.

Do not allow your boats to be made into lumber lockers, but keep them and all their fittings in perfect order.

I once joined a vessel about to commence her fifth voyage to India. I found by her logs she had lost two *lives* overboard at sea, and one at Singapore harbour, and yet her life-buoys, up to my joining, were kept in the sail-cabin *below*.

Owners and superintendents sometimes make it a practice of examining coal lockers, store rooms, paint lockers, &c., and their estimation of their officers' character must, in a great measure, depend upon the state in which they are kept. As a rule the character of a chief officer can be told by the clean orderly state of his vessel, though circumstances sometimes conjoin to prevent a ship being kept in perfect order. At such times do not be tempted to neglect any labour that will advance the speed of your ship in order to utilise it for cleaning purposes.

It is more important that she arrives home quickly than cleanly. A good deal of painter's stores are sometimes worse than wasted in hurriedly cleaning up for harbour. A clean wash is better than a dirty paint, and labour is well bestowed that is spent in thoroughly cleaning wood and iron before painting it. If possible

wash it all over with a little fresh water to get the salt off, and be sure that it is thoroughly dry before commencing to paint. Two thin coats are better than one thick one, and a little trouble taken to *show* your men how to lay it on thin and smooth to fill up every little crevice and corner, will be amply repaid by the greater credit the ship will bring you. Use boiled oil without turps for black and coloured paints, which have not much "body" in them. You can add a little patent dryers if necessary. Boiled oil is at all times best for iron, but you may use raw and a little turps for white lead if you wish it to dry very white. Strain your paint; do not mix much at once, and see that the lead is scraped carefully from the sides of the pots, and covered with water to prevent waste. Paint brushes require to be thoroughly washed before putting away. This is best done with soap and hot water. Do not trust a boy to do it; for, if any paint is left in, they will harden and spoil.

Custom or usage allots to each officer on board the portion of stores, &c., to which it is his particular duty to attend; and you must see that they do this, for it would not save your employer from loss to know that the ropes, sails, or provisions, wasted or injured by neglect, were under the charge of boatswain, sailmaker, or steward. With stores, as with time, there is no part that you can divest yourself of the responsibility of caring for. It is true that the master generally takes the more immediate supervision of those officers, and gives his orders to them direct; but that does not release you from your responsibility. Neither can you acquire the habit of supervision—so necessary in a commander—if you neglect to cultivate them until you have assumed that position. See that the stores are *safely* stowed at the outset, and exercise a quiet kindly supervision, which can generally be done without giving offence; but, in any case, allow no waste or neglect without reporting it, leaving the master to take the necessary steps in the matter. From the very nature of your calling there must of necessity be a limit to the consumption of stores; and the "feast to-day and fast to-morrow" system, while begetting no thanks for the *master*, inevitably leads to discontent at fasting time. Young officers sometimes set an example of wasteful extravagance in pro-

visions, thinking that they can become more temperate when they get supreme control. But they surely do not *think* far enough, or they would see that their selfish conduct tends to prevent that desired consummation. If they are vigilant officers, no waste can take place without their being aware of it. Once aware of any waste or neglect, by taking no steps to prevent it they become accomplices, and their *character must suffer.*

In ordering stores be careful to keep this idea in view: Do not keep back any surplus stores from your lists, with an idea of getting to windward of the owner—the result (as in sailmakers' bills) speaks for or against you. Order only sufficient to leave a safe margin for *probable* contingencies.

A SUNDERLAND COAL TAR.

(*To be continued.*)

SHOAL PATCHES ON THE GREAT BANK OF NEWFOUNDLAND.

(*Additional particulars.*)*

It appears that the U.S. S. *Kearsarge*, Commander H. F. Picking, has lately been examining the shoal patches on the Great Bank of Newfoundland. The following is the result of the observations:—

Early in 1879 it was reported that shoal water had been discovered eastward of the Virgin rocks. The statement is as follows: —"December 12, 1878, John Ryan, sailing out of St. Johns, Newfoundland, in the capacity of master of a banking schooner, reports that he has sounded on a rock with 14 fathoms on it E.S.E. 12 miles from the Virgin rocks; it is generally covered with vessels at anchor fishing; the fishermen informed him that another rock, with only 7 fathoms, lay S.S.W. three-quarters of a mile from this rock; he also reports that rocky patches with from 5 to 10 fathoms on them lie S.S.W. and S.S.E. 20 miles from the Virgin rocks."

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* See also November Number of *Nautical Magazine*, p. 960.

On the existence of shoals and rocky patches to the southward of the Virgin rocks, &c., Commander Picking reports that, on the morning of July 17, 1879, being then about 20 miles S.S.W. of Virgin rocks, he stood to the eastward in order to pass over the positions of the reported shoals, and sounded about every half hour, or about every 2 miles, in regular depths of 45 fathoms, rocky bottom.

With reference also to the rocky patch reported as lying E.S.E. 12 miles from the Virgin rocks, Commander Picking says that on his arrival in that locality he found several American schooners at anchor, and sounding, he found depths varying from 10 to 12 fathoms, but was informed by the fishermen that a *seven-fathom patch* does exist there, as reported by John Ryan. The summary of these investigations may be put as follows:—

Eastern Shoals.—These shoals were visited by the *Kearsarge*, and several traverses made over them, on which least depths of 12-fathoms were found. The fishermen, however, state that a 9-fathom spot exists there, and that one of their number recently had his hawser chafed through on it and broke adrift.

The position (*see* chart, p. 960) on the 9 fathom bank was determined by the *Kearsarge*, viz., lat. 46° 25′ 30″ N., and long. 50° 32′ 30″ W. *Variation*, 31° *W*.

Jesse Ryder Shoal was reported in 1845, with only 21 feet of water on it, and having a surface of 100 to 200 feet. The supposed discovery originated with the master of the fishing schooner, *Bethel*, the latitude was given as 46° 30′ N., and about 30 to 50 miles eastward of the Virgin rocks. The *Kearsarge* examined the locality of this shoal or 21-foot rock, without seeing any trace of it; and the fishermen repudiate all knowledge of it, thus corroborating Staff-Commander W. F. Maxwell's report to the Admiralty.

The following alleged position of a rock is not near the Banks of Newfoundland, but being on the line of route to and from the United States, and having been examined by the U.S. s. *Kearsarge*, may well find a place here.

Watson Rock.—This rock was reported in 1824 in lat. 40° 18′ N., long. 53° 40′ or 53° 22′ W., and the depths thereabouts

being very great, it had long been supposed to be a myth; but a later report appeared in 1876 as follows:—"Captain Lopez, of the Spanish ship *Santissima Trinidad*, saw the rock on October 8, 1875, and described it as being circular, black, and about 26 feet in diameter, with two small peaks on its southern part. He lowered a boat and approached on the N.W. and S.E. sides to within 30 yards of the rock, and found bottom in 23 and 32 fathoms respectively, but a little farther off he could get no bottom at 82 fathoms."

Commander H. F. Picking unsuccessfully searched for Watson's rock during two entire days, under most favourable circumstances of wind, weather, and sea, with careful look-outs on deck and aloft, and sounding frequently with 190 fathoms of line.

The *Kearsarge* passed directly over the reported position, but could discover no appearance of a rock or breakers, and Commander Picking is of the opinion that no rock exists in or near the spot.

CORRESPONDENCE.

"PRINCESS ALICE" AND "BYWELL CASTLE" COLLISION.

To the Editor of the "Nautical Magazine."

Sir,—I have noticed in your August number a letter taken from the *Times*, signed "P. H. Colomb, Harrow, July 16th;" also, in your September issue, a letter from the same gentleman on the same subject. Now, I quite agree with him that the Court of Appeal could not very well have done otherwise than reverse the decision of the Admiralty Court, which found the *Bywell Castle* a contributory party to the collision, but I fail to see the important step taken by the Court, viz., of condemning the movement of the *Bywell Castle*. Your correspondent, being a nautical man, must know that theory is very well, but in practice is oftentimes put aside, especially in the movements of ships under weigh. Your correspondent's theory I cannot see. He remarks the *Bywell Castle* had a distinct signal from the *Princess Alice* that the latter was starboarding her helm or bringing the ship to port, and in the

face of it the *Bywell Castle* ported her helm, bringing the ship to starboard. The latter saw the red and white light of the *Princess Alice* nearly right ahead. Of course the *Bywell Castle* ported; then came the distinct signal from the *Princess Alice* that she was starboarding; the *Bywell Castle* being under port helm, it was too late then to think of starboarding, hence the helm was put hard-a-port.

Surely your correspondent must know that when a ship is under the influence of one helm, that influence cannot be counteracted all at once and the vessel put under the influence of the other helm, and I contend the *Princess Alice* had as distinct a signal from the other ship that she was under port-helm as the reverse, that the *Princess Alice* was starboarding.

Of course, with more room and the ships a greater distance apart, then perhaps your correspondent's idea might have been carried out.

There is another point. I quite agree with him that very few indeed of the leading naval men can understand his views on the subject.

I remain, yours faithfully,

Constantinople, STEAMSHIP.
October 10th.

THE HEALTH OF SEAMEN.

To the Editor of the "Nautical Magazine."

SIR,—You have, before this, published communications from me on the above subject. In those communications I tried to show the advantages that would be derived from having a report on the health of each seaman, by leaving a space in the discharge certificate similar to those for conduct and capacity. I would add to the arguments already used, the fact of the large amount yearly spent for the return from abroad of *unhealthy* seamen, and for their maintenance in hospital in foreign ports.

Another object of my present letter is to bring to the notice of captains and others the possibility of fever symptoms becoming seriously aggravated by the previous neglect of administering lime-juice to seamen. I have recently had opportunities of noticing

cases, which under other circumstances would have been mild remittent fever, but which, from an apparent neglect of taking lime-juice, resulted in a mixture of scurvy and fever, and closely resembled yellow fever.

I beg to remain, Sir, your obedient servant,

J. NUMA-RÂT,
Surgeon.

South America,
October 10th, 1879.

SHOALS ON THE BANKS OF NEWFOUNDLAND.

To the Editor of the "Nautical Magazine."

DEAR SIR,—The chart of these shoals in your November number will be looked on with great interest by the geologist and the seaman, for it is reasonable to infer that many of them have been deposited since the last surveys were made.

Occasionally, when steaming in this locality, I have suspected that the depth of water was under that marked in the chart, but could not afford the time, in such a safe locality, to make a critical examination.

On August 26th, 1874, on a beautiful clear morning, in lat., by D.R., 46° 10′ N., long. 49° 49′ W., I heard the officer of the watch give an order to alter the course, and immediately afterwards he reported that he had done so to clear a shoal. Sure enough, just beyond the ship was a large patch of green water. I reported the circumstance to the Hydrographer, and in New York also named it to Captain Mirehouse, of the Inman steamer, *City of Montreal.* He informed me that some time before he was so much alarmed by the appearance of discoloured water in lat. 46° 12′ N., long. 49° 34′ W., that he stopped the ship, and sounded several times in 8½ fathoms—brown sand. I do not remember if his data was by D.R. If so, we doubtless passed over the same spot. The chart of the Messrs. Imray does not take in this position, which is to be regretted, as a regular survey might find less water than Captain Mirehouse recorded.

At present the largest ships may safely cross the Banks in any latitude south of the Virgin Rocks, but in the course of time the

same agency which has deposited that remarkable bank will build up dangers on it. I have seen a gigantic berg aground near the eastern shoulder, which appeared to contain much foreign matter. A heavy easterly swell was gradually pounding it to pieces, and, doubtless, boulders were released and deposited.

It has often surprised me to see large barques anchored in apparently 45 or even 50 fathoms of water with their ordinary bower cables. I now infer that they were on patches which, although well-known to their captains, had escaped the notice of surveyors.

Of late there has been a growing tendency to avoid the Banks, and although I disapprove of steaming in a stream of hot water without a good and sufficient reason, I think that during some months of the year it is wise to avoid crossing north of the southern edge, owing to the sudden and rapid rate in which field-ice drifts south. On Jan. 27th, 1875, I met, in lat. 46° 42′ N., long. 47° 17′ W., a quantity which streamed 22 miles in an east and west direction, but whose southern limit could not be seen from the masthead. Eighteen days previously there was not a particle within range. It is alleged to have extended fifty miles north and south; and ships were seen locked in with sails furled, as they would be in a Polar port.

Yours faithfully,

November, 1879. W. W. KIDDLE.

THE "PRINCESS ALICE" AND THE "BYWELL CASTLE."

To the Editor of the "Nautical Magazine."

Sir,—My attention was not called to Captain Parfitt's excellent letter on the above case in your October number until too late to ask you to insert a short comment on it. Perhaps you will kindly allow me to do so in your next number. I speak of it as an excellent letter, not because I agree with it, but because it has that precision and definiteness, which, on the subject of collisions, I so often miss.

Certainly his criticism is fair upon me. And if he thinks he sees inaccuracy, he is quite justified in pointing it out, and even in employing strong language against me, corresponding to the strength of my own.

My object in touching the *Bywell Castle* case at all, was never to apportion the blame, but to point the moral which might be drawn from it. Naturally, Captain Parfitt bases his criticism more from the point of view of a nautical assessor concerned in the case, and anxious to show that blame was not wrongly distributed. So, in controverting a statement I had made that I believed there was no good evidence to show that the *Princess Alice* ever saw both side-lights of the *Bywell Castle* at the same time, he quite properly produces the single witness—Webb—who, out of so many, bore clear testimony to the fact that he himself had seen both side-lights together distinctly. But my impression in reading the evidence was, that he was speaking of the earlier period when the red light might have been seen; and I was disposed to lean more heavily on the strongest part of his evidence that the green light of the *Bywell Castle* was always in sight from the very first to the very last. It is quite legitimate to allow this witness's testimony as to the red light to put aside the mass of the contrary evidence, but all I can say is, I did not, and do not now, care to deal with it. Chiefly perhaps, I am swayed by knowing that unless the *Bywell Castle's* lights were unusually badly fitted, the physical probabilities are against the fact.

But I should not have asked for space merely to defend my accuracy; my writings will generally speak for themselves on that head. What I do wish to point out is how strongly Captain Parfitt confirms the statements I have made as to the complete disorganisation of the opinion of seamen on the alphabet of avoiding collision.

When *red* changes to *both lights* and then to *green only* ahead, the seaman receives a very distinct signal of some kind. What sort of a signal is it, and what does it mean? It is a signal we constantly see at night. Does it mean that we ought to starboard, or to port?

The only reliable data we get as to the experience of seamen comes from the collision records, and they tell us that if the signal means port-helm, then it also means collision. Still, Captain Parfitt adds another to the many who reject what is the apparent teaching of the record. I, and those who think with me, would

wish to lay it down that the change from *red* to *both lights* a-head is a clear signal to starboard. Captain Parfitt considers that the opening of the green light at least is a signal that the ship making it is "shaping a course to pass him port-side to port-side." And he would, I suppose, port his helm.

My point is, that when a distinct signal is thus open to two opposite interpretations, collisions must follow as a matter of course; and that I think the point ought not to be left open as it is.

But Captain Parfitt goes on to what he will forgive me for saying appears to contradict this view. He draws a distinction between the opening of the *green* light and the shutting in of the *red*, as if they denoted two different movements; but of course the starboard-helm which is denoted by shutting in the red, is equally denoted by opening the green.

But the red being shut in, the question is, what does that signal mean? I, and those who think with me, believe it to be, as before, an order to starboard. Naturally we should all agree that if the distance is small, it also tells us to stop and reverse. Captain Parfitt thinks, and I fancy we all agree here, that we ought to get our ship's head canted to port if we can; but he would give the order, "hard-a-port, stop, and reverse;" while I should give the order, "hard-a-starboard, stop, and reverse."

Captain Parfitt would give his order in the belief that the engines would begin to reverse in time to get the rudder to act in the reverse way. I should give my order because I believed that the helm would do a good deal of work in canting her head to port, long before the engines could possibly be reversed, and because I think it impossible to say what the effect as to canting the ship's head will be when the engines are reversed.

These again are preliminary points of seamanship in avoiding collision. Both views cannot be right, but as long as we have these broad divergencies on the A. B. C. of the question, what can we hope for but abundance of collisions.

I am, Sir, your obedient servant,

P. H. COLOMB.

Harrow, November 18th, 1879.

PROPOSED RULES FOR THAMES TRAFFIC.

To the Editor of the "Nautical Magazine."

SIR,—Since the publication of your last number, in which I ventured to criticise the Report of the Thames Traffic Committee, the Conservancy Board has published certain proposed alterations in its Bye-Laws.

As might have been expected, the weight of the Committee has had the effect of preventing the Board's altering the present Port-to-Port Rule of the Road, notwithstanding the long experience it must have had of its insufficiency.

No one, however, was prepared for the Board's ignoring the pointed suggestions of the Committee relating to the regulation of the barge traffic, the present state of which is admitted on all sides to be the crying evil on the river. The monopoly of the Waterman's Company, and the question of compulsory pilotage, are no doubt beyond the powers of the Board, and must be left for Parliament to deal with, but the barge traffic is clearly within its jurisdiction. Truly, the action of the Conservancy Board has been as of one walking in his sleep, gazing without seeing, and when startled into wakefulness by the loud shout of public opinion, blundering in the wrong direction, ready, as soon as quiet is restored, again to relapse into its normal state of coma.

W. P.

SAN DOMINGO.—The British Vice-Consul at San Domingo has forwarded an official copy of a decree of the Dominican Government, dated the 14th of October, 1879, closing the ports of Porto Plata and Monte Christi to commence in general in consequence of the rebellion which has taken place in Porto Plata. According to this decree, which is signed by Cesareo Guillermo, President of the Republic, and is dated San Domingo, October 14, "the ports of Porto Plata and Monte Christi are closed to commerce in general, and all vessels arriving at the aforesaid ports are liable to the laws on blockade, which laws are to be in force in 15 days from this date for vessels proceeding from the West Indies, in 30 days for vessels proceeding from the American Continent, and in 45 days for vessels proceeding from Europe."

WEATHER FORECAST FOR DECEMBER, 1879.

THE CURRENTS OR TENDENCY OF THE AIR OVER THE BRITISH ISLANDS FOR THE MONTH OF DECEMBER, 1879.

Date.	Primary Tendency from	Force from		General Direction from	Secondary Tendency from	General Direction from	Probable Prevailing Tendency from	Probable Winds.
Dec.		N. or S.	E. or W.					
1	7 h.m.	1½	11½	W.N.W.	4 h.a.	E.S.E.	E.S.E.	Anticyclonic
2	6 m.	4	11	,,	6 a.	,,	,,	winds, same
3	6 m.	6	8	N.W.	8 a.	S.E.	S.E.	as tendencies,
4	6 m. †	8	6	,,	9 a.	,,	,,	westerly in
5	6 m.	9½	5	N.N.W.	11 a.	S.S.E.	S.S.E.	the N. to east-
6	6 m.	11	4	,,	...	...	,,	erly in the S.
7	6 m. *	11½	4	,,	0 m.	S.S.W.	N.N.E.	
8	7 m.	12	4	,,	1 m.	,,	,,	
9	8 m. †	12	5	N.N.E.	2 m.	,,	,,	
10	9 m. *	10½	7	,,	3 m.	,,	S.S.W.	S.W. and N.E.
11	10 m.	8½	9	N.E.	3 m.	S.W.	S.W.	
12	1 a.	7½	10	E.N.E.	4 m.	W.S.W.	W.S.W.	
13	5 a.	1½	14½	E. by N.	4 m.	W. by S.	W. by S.	
14	5 a.	2½	13	E.S.E.	4 m.	W.N.W.	E.S.E.	
15	6 a.	6	10	,,	4 m.	,,	,,	
16	8 a. †	9	7	S.E.	4 m.	N.W.	S.E.	
17	10 a.	10½	5	S.S.E.	4 m.	N.N.W.	S.S.E.	Anticyclonic.
18	11 a. *	11	4	S.S.W.	4 m.	,,	,,	
19	11 a.	11	3½	,,	5 m.	,,	,,	
20	... †	...	...	...	5 m.	,,	,,	
21	0 m.	11	3	S.S.W.	6 m.	N.N.E.	N.N.E.	
22	1 m.	10½	4	,,	7 m.	,,	,,	S.W. and N.E.
23	1 m.	9½	4½	,,	8 m.	,,	,,	
24	1 m. *	8	6	S.W.	10 m.	N.E.	S.W.	
25	1 m.	6	8	,,	11 m.	,,	,,	
26	1 m.	4½	9	W.S.W.	noon.	E.N.E.	W.S.W.	
27	1 m.	2	11	,,	3 a.	,,	,,	
28	5 m.	0½	12	W. by N.	3 a.	E. by S.	W. by N.	S.W. to N.W.
29	5 m.	3	10½	W.N.W.	4 a.	E.S.E.	W.N.W.	
30	4 m.	5½	8	N.W.	5 a.	S.E.	N.W.	
31	4 m. †	7½	7	,,	7 a.	,,	,,	

NOTE.—General direction of tendencies due to Sun from E.N.E. Daily change about 1 a., and from W.S.W. about 6 m. Prevailing tendency from E.N.E. Depressions probably travelling from W.N.W. to E.S.E., giving winds chiefly from W.N.W. to W.S.W. or from E.N.E. to E.S.E. These tendencies change after the 22nd to W.N.W. Daily change about 6 m., and from E.S.E. about 1 a. Both tendencies strong. Depressions probably travelling from W.S.W. to E.N.E., giving winds chiefly from W.S.W. to W.N.W., or from E.S.E. to E.N.E.

* Retrograde movements begin. † Expansive movements begin.

(1.)	Moon's maximum S. declination on the			13th	= 25° 20′, decreased 3′.	
(2.)	,,	,,	N. ,,	,, 27th	= 25° 21′, increased 1′.	
(1.)	Will probably be felt	from the		10th	to the	15th.
(2.)	,,	,,		24th	,,	30th.

REMARKS.

1. Principal transition periods 7th and 8th, and 18th and 19th.

2. Stormy periods from the 1st to the 8th, and 18th to 31st. The highest rotatory velocity occurs during the Moon's easterly tendency, which, during winter, is normally the quiet period of the month, and during summer the stormy period—or more exactly from March to September (both inclusive) in the latter, and from October to February in the former. Hence from October to February may be expected to be comparatively quieter. In the year 1876 the highest rotatory velocity occurred during the Moon's westerly tendency, and from October to February was a very stormy period. The stormy periods stated above may, therefore, be expected to be under the average in the number of storms.

3. The force from the North has again decreased, and the rotatory velocity increased, since last month.

4. The winds due to prevailing tendencies can be readily found from Table given last month. Ordinarily the winds do not veer or back to the extent given in the Table.

BOOKS RECEIVED.

The September Taifuns (*Typhoons*) 1878, *in the China and Japan Seas, with charts and diagrams.* By E. Knipping, Tokio, Japan.

Our own countrymen in the East have long been famous for their learned societies of all kinds, and we in the West fully appreciate, and are glad to take advantage of, the knowledge they disseminate. From the imprint on the pamphlet before us, it appears that the Germans also have their societies for the cultivation of natural knowledge and folk-lore, and this part of their "Proceedings" has been published in English for the benefit of shipmasters who navigate the China and Japan seas; it relates to the three typhoons which raged on the coasts of Japan and China in September, 1878. The material for the discussion of these storms was derived from log-books, and from data furnished by the meteorological observatories at Tokio, Nagasaki, and Zi-ka-wei.

Thus the two sets of observations—on land and on sea—enhance the value of the information given in Mr. Knipping's brochure, and especially so in respect to the last and worst of the three typhoons, which was tracked from the 15th to the 22nd of September, as its centre travelled N.Wly. passing between the Meiako-sima and Liu-kiu Islands, thence due north, midway between China and Kiusiu, until it arrived westward of Quelpart, and finally between Korea and Japan in an E.N.E. and N.Ely. direction through the sea of Japan towards the north end of Nipon.

We can do no more than call particular attention to the *summary* of the investigation. "The recurving of typhoons has often been reported where it did not take place. The rate of progress of this typhoon was, on the average, about 10 miles per hour, but varying from 2·3 to 25 miles per hour. The greatest distance from the centre at which the wind reached force 9 or more was 500 miles. In the western half of the typhoon, a border-line, well marked in some places by a higher barometer, separated, within a very short space, gales from moderate winds; whether this high barometer ridge is noticed or not on board depends on the relative motion of the ship and isobar. The centre bore ten points from the wind within a distance of 400 miles from the centre, and therefore a vessel if running should never run right before the wind, but (if possible) always keep the wind well on the starboard quarter, in the northern hemisphere. The bearing of the centre varied with the distance from the centre, thus:—With N.E., N.W., and S.W. winds the angle increased with the distance, while with S.E. the reverse was the case. With N.E. wind, and 900 miles from the centre, the latter bore right a-head. With S.Ely. wind, and general signs of an approaching typhoon, the centre may bear south. While with N.W. wind the veering of the wind was regular and allowed a fair estimate to be made of the track, the same was not the case with N.E. and S.E. winds in front of the centre, except after a very decided change of wind. A S.E. wind, when in front of the centre, with force low, was the most treacherous of all winds. Of two ships which tried to run across the track before the centre, one foundered, and the other succeeded, but with 11 feet of water in the hold."

The chart and diagrams which accompany the letter-press admirably illustrate the different phases of the storm in its progress, and any of our readers who visit Japan would do well to procure a copy of the pamphlet.

Mr. Scott, the able chief of our own Meteorological Department, has justly said that "Modern meteorologists, almost with one voice, declare for a spirally incurving movement as the most probable behaviour of the wind" in cyclones and hurricanes, and Mr. Knipping's is the latest contribution exemplifying this fact; Mr. Meldrum, of the Mauritius, has long maintained it; and Captain Toynbee has written to the same effect. But this view presents no novelty; those who years ago propounded the "Law of Storms" were of the same opinion, and our shipmasters will do well to carefully re-study the subject by the new light that has been thrown on it.

Tabulated Weights of Angle, Tee, Bulb, Round Square and Flat Iron and Steel, &c. By Chas. H. Jordan, M.I.N.A., &c. THIRD EDITION. London: E. & F. N. Spon, 46, Charing Cross. 1879.

NAVAL architects and shipbuilders have long been familiar with this handy little work, and have found it of great service in calculating the weights of iron ships. It has also been found very useful by engineers and others in connection with the iron work of shore structures. The chief feature in this new edition is the introduction of tables respecting the weight of mild steel; and, in view of the growing use of this material for shipbuilding, this addition considerably enhances the value of the little book. Mr. Jordan's extensive experience with iron ships, and his position as Surveyor to the Underwriters' Registry for iron vessels, afford a sufficient guarantee of the trustworthiness of his work, and we confidently recommend it to all who are concerned with iron and steel work as a handy compendium of useful and accurate tables.

Historical Notes on Shipping. By PERCY L. ISAAC, M.I.N.A. London: J. D. Potter. 1879.

WE take it that this little work is mainly intended for the edification of youthful minds, and also in some measure as a vindication of the part taken by the Hebrew race in connection with the develop-

ment of navigation and shipping, which the author regards as having been generally ignored by writers on the subject. Accordingly the author commences his historical notes with a reference to Noah's Ark, and then deals with the ark of bulrushes in which Moses was concealed, both of which references are obviously suited to the comprehension of the infant mind. From Moses to the Phœnicians and thence rapidly through the early periods, introducing the Assyrians, Carthagenians, Rhodians, and others, Mr. Isaac proceeds until he comes to the Saxons and Danes. He then briefly puts together fragments gathered from various authors in reference to the shipping of the middle ages, and arrives at length at the present century. What he tells us about the recent progress of shipping may or may not be accurate, but we are sure it is very incomplete. If the author considers that his work is likely to be of service to the nautical community, we fear it is necessary to undeceive him, but we are willing to admit it to be possible that as "one of the ideas which prompted the writing of this sketch was to be instructive to youth," young people may derive some amusement and perhaps advantage from its perusal.

If Mr. Isaac intends his work for grown-up people we can only say that he has attempted an ambitious task, and one which better men than he would think twice before venturing upon,—and that for general acceptance by those practically interested in maritime matters something better is wanted in the way of "Historical Notes on Shipping" than a *rechauffé* of popular lectures written for the "Jewish Working Men's Club and Institute," and for a suburban "Congregational Church Literary Society."

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS.)

4158. Albert Paul Passett, Paris. "Improvements in swimming apparatus." (A communication.)

4241. Thomas Davison, Glasgow. "Improvements in, or connected with, steam hoisting machinery as applied on shipboard."

4284. Orby C. Mootham, Bournemouth. "Improvements in oars and sculls."

4298. Frank R. Francis, Lawford Road, Middlesex. "Improvements in apparatus for transmitting and receiving signals on ships and vessels, and for other purposes."

4360. Oscar E. Huss, Washington, U.S.A. "Improvements in apparatus to be used as shroud-blocks for ships' rigging, and for similar purposes." (A communication.)

4371. Charles Jones, Liverpool. "Improvements connected with screw-propellers for steamships."

4374. Heinrich M. Jepsen, Flensburg. "Improvements in apparatus for cleaning the bottoms of ships while in motion." (A communication.)

4398. Edgar E. Mann, Lawrence, Essex, U.S.A. "Improvements in signal buoys." (A communication.)

4470. Josiah L. Clark, and John Stanfield, both of London. "Improved apparatus and mode of constructing piers, breakwaters, and other similar structures."

4504. John McCarthy, Dublin. "An improved apparatus for saving life at sea."

4539. William H. Watling, Middlesborough-on-Tees. "Improvements in the arrangement of davits, chocks and other gear for carrying ships' boats, and placing them in the water, applicable also for manipulating the anchors of steam and other ships."

4574. John E. Liardet, Brockley, Kent. "A new or improved propeller for ships and other vessels."

4585. Captain A. Jaeger, Bremerhaven, Germany. "Improvements in and connected with steam for horns." (A communication.)

AMERICAN.

219278. C. Lazarevitch, Brooklyn, N.Y. "Devices for preventing the shifting of grain in vessels."

219305. R. Quintavalle, Brooklyn. "Devices for preventing the shifting of cargoes in vessels."

219405. J. J. Kunstadter, London. "Steering propellers."

219460. A. Gordon, New York. "Ship's logs."

219662. P. P. Voorhees, New York. "Steering ships by steam and other power."

219711. W. Giese, Bordeaux, France. "Submarine torpedoes."

219831. H. H. Stekon, Revere, Mass. "Rigging for fore-and-aft sails."

219837. G. Vincent, Stockton, Cal. "Propellers for vessels."

219896. B. T. Babbitt, New York. "Pneumatic propulsion of vessels."

220230. J. W. Fowle, Boston, Mass. "Ship's night signals."

220231. J. W. Fowle, Boston, Mass. "Ship's fog-signals."

220622. W. Huston, Wilmington, Del. "Ship's speed and leeway indicators."

AUSTRIAN.

1160. J. F. Chaffaud, Bordeaux, and G. C. Barbotin, Dres. (France). "A hammock applicable as a life-buoy."

1197. A. Gareis, Polo. "An apparatus for propelling ships and boats by means of a screw-propeller and hand-power."

1365. A. Stephany, Bruchsal. "A river boat."

1503. W. C. Hallett, London. "Improvements in the construction of ships' propellers and articles with helical surfaces."

BELGIAN.

49297. J. C. Gaultier. "Threefold boats."

49315. F. G. E. Weir. "Swimming apparatus."

49362. P. Arbogast and T. J. MacTighe. "Manufacturing metallic cables with glass coatings."

FRENCH.

129,943. Bouron and Touzet. "A steam-dock for floating sea-vessels on rivers."

130,084. Passet. "Swimming apparatus."

130,111. Desrues, Sen., Quimper. "A life and towing buoy propelled by sail."

130,232. Wilkinson and Hardinge. "Improvements connected with the manufacture of reflectors for ships', railway, and other lamps, or lighting vehicles, said manufacture being applicable for advertising and other tablets."

130,243. Gravier, Havre. "A propeller."

LOWERING SHIPS' BOATS.

1220. James Clark, Barrow-in-Furness, Lancashire. "This consists in using an endless or continuous rope for both bow and stern tackle of the boat, instead of suspending the boat by two distinct and unconnected tackles. The single rope is rove through the double blocks of one tackle; one end of the rope is left for belaying or handing at the davit, and the other end is continued from the boat-block and then rove through the double block at the other end of the boat, the end of the rope finally finishing at the second davit for belaying or handing. One gang of men thus is only required to raise or lower the boat instead of two as heretofore. The boat-block is attached to the boat by a loop which takes on to a tumbler hook (the formation and use of which constitutes the second part of this invention) fixed on the boat, and so arranged that by being weighted at one side the hook releases itself from the block the instant the boat is water-borne.

STEERING ENGINES.

1247. James Rennie Scott, Pollockshields, Renfrew, N.B. This invention has for its object to improve and simplify the construction or arrangement of steering engines to be worked by steam or other fluid under pressure. In one modification of the improved steering engines there are two cylinders placed longitudinally, and their piston-rods are connected with overhung crank-pins on a transverse horizontal shaft, having on it a worm which gears with a worm-wheel on the main shaft. The chains proceed from a pulley on this shaft to the rudder. When the engine is working, the pinion is moved along its shaft, out of gear from the spur-wheel, and when the steam is not available the worm-wheel is disconnected from the main shaft by means of a clutch. When the handing-shaft is turned by the steering-wheel, it causes the

cylinder valves to be moved, and consequently the rotation of the shaft.

APPARATUS FOR STEERING SHIPS.

1338. John Eccleston, Liverpool, and 323, High Holborn, Middlesex. This invention is designed with a view of doing away with the troublesome and costly right and left-handed screw of the ordinary mechanism used in large ships, where the wheel shaft is connected by links direct to the crosshead on the rudder stem, and in otherwise simplifying the mechanism. It consists in making the connecting rods or links linked to the crosshead on the rudder post of equal length, and linking them to pins or bolts on a similar crosshead or disc on a vertical shaft or capstan. On this shaft is placed a worm wheel gearing into a worm on the horizontal shaft on which the hand wheel is placed. This shaft is supported on bearings in the frame that carries the shaft on which the worm wheel and disc rotate, and both frame and vertical shaft are placed a little to one side of the centre line of the ship, so that the horizontal shaft and hand wheel may be in the centre line.

PROPELLING VESSELS.

1624. Count Gustave de la Marronnière, Paris. This invention relates to an improved apparatus for propelling vessels, torpedoes, &c., and consists of a wheel or propeller provided with vanes and rotating upon two axes forming an angle with each other. One half of the propeller is carried on an inclined shaft rotating in bearings secured to suitable supports so that the plane in which this half of the propeller revolves is inclined; the inclined shaft is provided at one end with suitable gearing by means of which the requisite rotary motion is imparted to it, and on the other end there is keyed a boss carrying arms connected to it by joints. The complete propeller is formed by the combination of two halves of exactly similar construction arranged with their axes inclined to each other, so that the upper part of the bosses carrying the arms are nearly in contact. Vanes capable of folding up connect the arms on the two halves of the propeller, and are opened to their fullest extent when at the lower part of the propeller, and consequently exerting their propelling power, closing up as they reach the upper part, thus presenting their edges only to the water, and offering no resistance.

TIDE TABLES FOR DECEMBER, 1879.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	London Derry. A.M.	London Derry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
M	1	3 6	3 23	7 37	7 54	4 29	4 47	3 24	3 41	6 40	6 56	0 6	0 25	8 0	8 17	0 10	0 27	0 58	1 16	6 8	6 26	—	0 15	9 2	9 18	4 50	5 7
Tu	2	3 40	3 59	8 11	8 29	5 5	5 23	3 59	4 18	7 12	7 28	0 41	1 3	8 34	8 51	0 44	1 1	1 34	1 51	6 43	7 2	0 33	0 52	9 34	9 52	5 24	5 43
W	3	4 17	4 34	8 48	9 8	5 43	6 3	4 38	4 58	7 46	8 4	1 23	1 43	9 8	9 25	1 20	1 39	2 9	2 28	7 21	7 40	1 13	1 33	10 11	10 31	6 2	6 22
Th	4	4 53	5 12	9 28	9 49	6 23	6 45	5 19	5 42	8 23	8 43	2 3	2 24	9 43	10 1	1 58	2 18	2 47	3 8	8 0	8 20	1 53	2 16	10 55	11 23	6 43	7 6
F	5	5 32	5 54	10 12	10 37	7 9	7 35	6 6	6 30	9 5	9 28	2 46	3 8	10 19	10 38	2 39	3 2	3 29	3 51	8 40	9 2	2 39	3 2	11 53	—	7 29	7 53
S	6	6 18	6 45	11 4	11 34	8 2	8 30	6 56	7 26	9 52	10 20	3 31	3 55	11 0	11 26	3 26	3 52	4 14	4 39	9 25	9 50	3 27	3 56	0 25	0 59	8 18	8 45
S	7	7 12	7 41	—	0 6	9 3	9 37	7 57	8 29	10 50	11 23	4 19	4 45	11 55	—	4 21	4 54	5 6	5 35	10 19	10 52	4 27	4 59	1 36	2 14	9 15	9 49
M	8	8 12	8 45	0 39	1 11	10 12	10 46	9 5	9 41	11 58	—	5 15	5 45	0 27	1 0	5 30	6 8	6 8	6 41	11 26	—	5 31	6 3	2 50	3 22	10 24	11 1
Tu	9	9 20	9 54	1 42	2 13	11 19	11 51	10 13	10 44	0 35	1 13	6 16	6 50	1 35	2 10	6 45	7 18	7 15	7 49	0 1	0 35	6 34	7 5	3 51	4 18	11 37	—
W	10	10 26	10 59	2 44	3 14	—	0 20	11 13	11 41	1 49	2 23	7 24	7 56	2 45	3 21	7 50	8 19	8 21	8 53	1 9	1 43	7 36	8 6	4 42	5 6	0 9	0 40
Th	11	11 31	—	3 44	4 14	0 47	1 14	—	0 8	2 54	3 25	8 26	8 56	3 57	4 32	8 47	9 15	9 24	9 53	2 15	2 46	8 36	9 6	5 30	5 55	1 10	1 39
F	12	0 2	0 29	4 42	5 9	1 41	2 7	0 35	1 2	3 54	4 22	9 25	9 54	5 5	5 36	9 42	10 8	10 22	10 51	3 16	3 45	9 35	10 1	6 22	6 49	2 7	2 38
S	13	0 57	1 25	5 36	6 2	2 32	2 57	1 28	1 54	4 50	5 18	10 23	10 52	6 6	6 34	10 34	11 0	11 20	11 48	4 13	4 41	10 26	10 51	7 16	7 43	2 59	3 25
S	14	1 52	2 18	6 29	6 56	3 22	3 48	2 20	2 45	5 45	6 12	11 21	11 50	7 2	7 30	11 26	11 52	—	0 16	5 9	5 37	11 16	11 42	8 8	8 33	3 51	4 17
M	15	2 43	3 9	7 23	7 49	4 14	4 40	3 10	3 35	6 38	7 2	—	0 17	7 55	8 18	—	0 18	0 44	1 10	6 2	6 27	—	0 8	8 56	9 19	4 43	5 9
Tu	16	3 34	3 58	8 13	8 37	5 6	5 31	4 0	4 25	7 25	7 47	0 44	1 11	8 41	9 3	0 44	1 9	1 35	1 59	6 51	7 15	0 34	1 0	9 42	10 5	5 33	5 56
W	17	4 23	4 47	9 1	9 25	5 56	6 20	4 50	5 15	8 9	8 30	1 36	2 0	9 24	9 44	1 32	1 55	2 22	2 45	7 38	8 0	1 25	1 49	10 28	10 51	6 19	6 41
Th	18	5 10	5 32	9 48	10 10	6 44	7 8	5 39	6 3	8 51	9 12	2 24	2 46	10 3	10 21	2 18	2 40	3 7	3 28	8 21	8 42	2 18	2 37	11 17	11 47	7 4	7 27
F	19	5 55	6 19	10 38	10 59	7 32	7 58	6 28	6 53	9 33	9 53	3 8	3 29	10 39	10 58	3 1	3 23	3 50	4 12	9 3	9 23	3 1	3 25	—	0 17	7 50	8 13
S	20	6 42	7 7	11 27	11 55	8 24	8 51	7 19	7 46	10 16	10 39	3 51	4 18	11 18	11 42	3 46	4 11	4 35	4 58	9 43	10 7	3 49	4 16	0 49	1 22	8 37	9 2
S	21	7 32	7 58	—	0 24	9 21	9 53	8 15	8 45	11 4	11 31	4 35	4 59	—	0 9	4 39	5 9	5 23	5 49	10 33	11 5	4 44	5 13	1 56	2 30	9 29	10 0
M	22	8 25	8 56	0 53	1 22	10 25	10 57	9 17	9 51	—	0 3	5 25	5 53	0 38	1 12	5 42	6 20	6 19	6 52	11 38	—	5 42	6 13	3 1	3 32	10 36	11 11
Tu	23	9 30	10 6	1 53	2 24	11 29	—	10 23	10 54	0 38	1 11	6 26	6 59	1 46	2 20	6 55	7 28	7 25	7 58	0 11	0 44	6 44	7 15	4 1	4 29	11 46	—
W	24	10 39	11 11	2 55	3 26	0 1	0 32	11 25	11 54	1 44	2 17	7 34	8 7	2 55	3 30	8 1	8 32	8 33	9 4	1 19	1 54	7 46	8 17	4 55	5 19	0 21	0 52
Th	25	11 41	—	3 57	4 28	1 0	1 25	—	0 19	2 47	3 16	8 35	9 0	4 8	4 38	8 57	9 21	9 32	9 54	2 23	2 50	8 44	9 10	5 41	6 2	1 19	1 45
F	26	0 10	0 36	4 48	5 9	1 48	2 8	0 41	1 3	3 44	4 8	9 21	9 46	5 1	5 26	9 42	10 2	10 22	10 44	3 15	3 37	9 35	9 57	6 28	6 44	2 7	2 28
S	27	1 0	1 30	5 29	5 49	2 28	2 48	1 23	1 44	4 32	4 55	10 8	10 30	5 49	6 12	10 22	10 41	11 5	11 26	3 59	4 21	10 17	10 35	7 4	7 24	2 48	3 7
S	28	1 41	2 1	6 9	6 29	3 6	3 28	2 3	2 21	5 16	5 35	10 51	11 12	6 33	6 53	11 0	11 19	11 47	—	4 40	4 59	10 53	11 10	7 44	8 2	3 26	3 45
M	29	2 19	2 36	6 48	7 7	3 41	3 59	2 39	2 56	5 54	6 18	11 32	11 52	7 13	7 32	11 38	11 57	0 7	0 26	5 18	5 37	11 27	11 44	8 19	8 36	4 4	4 22
Tu	30	2 58	3 11	7 25	7 43	4 17	4 35	3 13	3 30	6 31	6 49	—	0 11	7 50	8 7	—	0 15	0 45	1 4	5 56	6 14	—	0 1	8 52	9 8	4 39	4 56
W	31	3 28	3 46	8 1	8 19	4 58	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8 24	8 40	0 33	0 51	1 23	1 40	6 31	6 50	0 20	0 39	9 24	9 41	5 13	5 30

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub*.), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 33	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 33	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 33	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
855	England—South Coast—Scilly Islands—St. Agnes	Alteration of light in 1880.
856	„ „ Downs — N.E. Goodwin	Alteration of Buoy.
857	„ East Coast—Leman and Ower	Alteration of light carried out.
858	Scotland — East Coast — Tay River — Dundee	Railway bridge lights to show channel.
859	North Sea—Netherlands—Ems River—Delfzyl	Alteration of light.
860	Baltic Entrance—Sound—Copenhagen	Marks of torpedo ground removed.
861	Baltic—Sweden—Ystad	Alteration of West Mole light.
862	„ „ Oland Island — Ispe-udde	Alteration of light.
863	„ Kourland—Backofen	New light.
864	„ Riga Gulf—Pernau	Alteration of lights.
865	Bothnia Gulf—Biurö-Klubb	Fog-signal discontinued.
866	„ Hudiksvall	Exhibition of light delayed.
867	„ Sundswall—Draghall Rock	Particulars of light.
868	„ Skelleftea—Gasor Islet	Exhibition of light delayed.
869	„ Pitea—Lilla Leskär	Particulars of light.
870	Portugal—West Coast—Tagus River—Guia	Alteration of light.
871	Mediterranean—Italy—Genoa	Extension of Breakwater.
872	Red Sea—Suez Bay	New leading light.
873	India—West Coast—Calicut	Buoys marking foul ground.
874	Japan—Yezo—Hakodadi	Caution in anchorage.
875	South Australia—Investigator Strait—Nepean Bay—Kangaroo Island	Buoy marking submarine cable.
876	„ Beachport—Rivoli Bay	New buoy.
877	„ Gulf of St. Vincent — Port Adelaide	Depth of water on outer bay.
878	„ Spencer Gulf — Ward Spit	Alteration of buoy.
879	„ „ Germein Bay —Port Pirie	Sailing directions.
880	Australia—Bass Strait—King Island—Currie Harbour	Light to be established, March, 1880.
881	West Indies—Haïti—Santo Domingo	Alteration of light.
882	„ „ Port Plata	New light.
883	North Atlantic—Bermuda — St. David Island—St. David Head	New light.
884	United States—Florida—Cape Canaveral	Automatic signal buoy.
885	„ Chesapeake Bay—Hooper Strait	New light.
886	„ New Jersey—Five Fathom Bank	Automatic signal buoy.
887	„ Maine—Casco Bay	Automatic signal buoy.
888	Canada—Bay of Fundy—Grand Manan Island—Grand Harbour—Fish Fluke Point	New light.
889	„ Nova Scotia—Harbour au Bouche	New range lights.
890	Newfoundland — St. Pierre Island — Galantry Head	Colour of flashes of light and range.

NAUTICAL NOTICES.

355.—England.—*South Coast.—Scilly Islands.—Alteration in Character of the St. Agnes Light.*—During the month of June, 1880, the interval of revolution of the St. Agnes light will be altered from a flash every minute, to a flash every half-minute.

356.—England.—*South Coast.—Downs.—Alteration in Character of the N.E. Goodwin Buoy.*—One of *Courtenay's Automatic Buoys* will shortly be placed in the position now occupied by the north-east Goodwin buoy. Further notice will be issued when the change has been effected.

357.—England.—*East Coast.—Alteration in the Character of the Light at the Leman and Ower Shoals.*—With reference to previous Notices, the two fixed lights in the Leman and Ower light-vessel have been discontinued, and *one white revolving* light, showing two flashes in quick succession every half-minute, is now exhibited. The light is shown at an elevation of 38 feet above the level of the sea. The two masts and balls will remain as heretofore for a mark by day.

358.—Scotland.—*East Coast.—Tay River.—Dundee.—Railway Bridge Lights.*—The channel for shipping under the railway bridge a short distance above the town of Dundee, is indicated by the undermentioned lights:—A *red* light at the north side of the channel, a row of twelve intermediate *white* lights in the channel, and a *red* light at the south side of the channel. These lights are *fixed* lights, and each is placed on a pier of the bridge. During the day, round signal boards, 4 ft. in diameter, and painted red, indicate the positions of the red lamps on the piers which limit the channel. The headway between each pair of lamps at high water ordinary spring tides, commencing at the north end, and proceeding consecutively, is 74 ft.-77½-81-84½-87-88-88-88-88-88-88-87¾-87½ ft.

359.—North Sea.—*Netherlands — Ems River. — Delfzyl.— Re-exhibition of Harbour Light.*—With reference to Notice 311, p. 982, on the temporary discontinuance of the outer harbour light at Delfzyl, pending alteration in its position. On 1st October,

1879, the light (fixed white) was re-exhibited near the stone mole (Baarstenhoofd)—north-eastward of its former position on the North mole.

360.—BALTIC ENTRANCE.—*The Sound.—Copenhagen.—Removal of Buoys and Lights marking Torpedo Ground.*—The buoys and beacon-lights to mark the limits within which torpedo experiments would be made between Provestenem and Mellem forts, near Copenhagen, are now removed.

361.—BALTIC.—*Sweden.—Ystad.—Alterations in West Mole Light.*—A new light is exhibited from the west mole head at Ystad, instead of the former mole light. It is a *fixed red* light, elevated 25 feet above the sea, and visible from a distance of 8 miles. The lighthouse, 27 feet high and painted white, is situated three yards eastward of the position of the old light on the west mole head.

Note.—This light kept in line with the fixed white light on the north side of the harbour, leads half a cable westward of the floating beacon at the entrance. In the lower part of the lighthouse, a reflecting apparatus is placed which illuminates the east mole head. With favourable weather, the harbour entrance may thus be made out from near the floating beacon.

362.—BALTIC.—*Sweden.—Oland Island.—Alterations in Ispe Udde Light.*—The light exhibited at Ispe point, west side of Oland island, now shows *two flashes* in quick succession at intervals of *four seconds'* duration, between the bearings N. 50° E., and N. 60° E. (the eastern limit of this sector indicates the position of Prestör reef): *fixed white* between N. 60° E. and N. 70° E.; *fixed red* between N. 70° E. and S. 18° E.; and *fixed white* between S. 18° E. and S. 30° W. *Variation*, 9¼° *W.*

363.—BALTIC.—*Kourland.—West Coast.—Light at Backofen.*—This is a *flashing white* light, showing *three flashes* in quick succession every *thirty seconds*, elevated 160 feet above the sea, and visible from a distance of 19 miles. The lighthouse is built of stone and painted red. Position, lat. 57° 11′ 5″ N., long. 21° 25′ 0″ E.

364.—BALTIC.—*Gulf of Riga.—Pernau.—Alterations in Lights.*—The two harbour lights at Pernau have been replaced by new lights, and the following alterations made :—The low light is *fixed*

red, elevated 45 feet above the sea, and visible from all directions seaward a distance of 12 miles. The high light is *fixed white*, elevated 69 feet above the sea, and visible 14 miles; it bears N. 42° E. from the low light, distant 413 yards.

Note.—These lights kept in line lead between the mole heads into Pernau river. The high light is obscured eastward of the bearing N. 22° E., thus indicating the shoal ground in the eastern part of Pernau bight. *Variation*, 5¼° *W.*

865.—GULF OF BOTHNIA.—*Discontinuance of Biurö Klubb Fog-Signal.*—The fog-signal (gong) at Biurö Klubb lighthouse, south side of entrance to Biurö fiärd, is discontinued.

866.—GULF OF BOTHNIA.—*Sweden.*—*Hudiksvall Light.*—*Exhibition Delayed.*—In respect to the intended exhibition of a leading light on Saltvik Udde, approach to Hudiksvall, the light will not be exhibited until the year 1880.

867.—GULF OF BOTHNIA.—*Sweden.*—*Sundswall*—*Particulars of Draghall Rock Light.*—With reference to Notice 818, p. 984, on the exhibition of the permanent light on Draghäll rock, approach to Sundswall harbour, the light, visible from a distance of 12 miles, shows from seaward a *single white* flash of *one second* duration, followed by an eclipse of *four seconds*, between the bearings N. 35° W. and N. 50° W.; *fixed white* between N. 50 W° and N. 64° W. (this sector leads clear of all shoals to the distance of one cable from Draghäll rock); and *two white* flashes in quick succession of *one second* duration each, followed by an eclipse of *four seconds*, between N. 64° W. and S. 75° W. In a north-westerly direction, a sector of *white* light is shown between the bearings S. 22° E. and S. 27° E., leading clear of the coast of Alnö and of Fäbo shoal, but not of Tiuf holm: in all other directions the light is obscured. *Variation*, 8½° *W.*

868.—GULF OF BOTHNIA.—*Sweden.*—*Skelleftea.*—*Gasör Islet Light, Exhibition Delayed.*—With reference to previous notice on the intended exhibition of 1879, of a light on Gasör islet, approach to Ursvik fiord and Skelleftea, the light will not be exhibited until the year 1880.

869.—GULF OF BOTHNIA.—*Sweden.*—*Pitea.*—*Particulars of Lilla Leskär Light.*—With reference to Notice 819, p. 984, this

light, visible from a distance of 12 miles, shows a *single white* flash of *one second* duration, followed by an eclipse of *four seconds*, between the bearings N. 18° E. and N. 12° W.; *fixed white* between N. 12° W. and N. 28° W. (this sector leads clear of all shoals to the distance of one cable from the light); and *two white* flashes in quick succession of *one second* duration each, followed by an eclipse of *four seconds*, between N. 28° W. and N. 67° W. To the northward, in the direction of Pit sund—the light shows *fixed green* between the bearings S. 21° E. and S. 14½° E.; *fixed white* between S. 14½° E. and S. 10½° E. (this sector leads clear of all shoals to the anchorage off Pit sund); and *fixed red* between S. 10½° E. and S. 8½° E. In all other directions the light is obscured. *Variation, 5¾° W.*

870.—PORTUGAL.—*West Coast.—Tagus River Entrance.—Alterations in Guia Light.*—With reference to Notice 190, p. 626, the permanent light is re-exhibited. It is a *fixed white* light, elevated 167 feet above high water, and visible through an arc of 288°, or between the bearings S. 20° E. and S. 52° W., from a distance of 15 miles. Position as given, lat. 38° 41′ 40″ N., long. 9° 24′ 35″ W. *Variation, 19¼° W.*

371.—MEDITERRANEAN.—*Italy.—Extension of Breakwater Works at Genoa.*—The work now extends in a south (*true*) direction from the new or west mole head for a distance of 699 yards, and its extremity is marked by a buoy painted black.

Note.—Vessels of large draught should pass southward of this buoy; care also should be taken not to mistake it for the pontoon mooring buoys, which are painted red.

372.—RED SEA.—*Gulf of Suez.—Leading Light in Suez Bay.*—On 1st January, 1880, a light will be exhibited on the north shore of Suez bay, as a leading light through the deep water channel westward of Newport rock, and the channel near the Spit buoy, thence to the anchorage in about 5 fathoms water. It will be a *fixed white* light, elevated 40 feet above the sea, visible through an arc of 14½°, or between the bearings N. 10¼° E., and N. 4¼° W., from a distance of about 10 miles. Over the bay and its approaches —through an arc of 345½°, the light will be obscured, and the obscuration will cover Kal-el-Kabireh shoal, and the Spit buoy.

The light will be shown from a mast (upper part for about 20 feet painted black) above a white dwelling; placed on the following bearings, viz.: South dock head, port Ibraham (Observation spot), S.S.E. ¼ E.; Newport rock light-vessel, S. ¼ E., Sly.; Kal-el-Kabireh shoal beacon, S. by W. ¼ W., Wly.; Atákah quarry, S.W. ½ W., Wly. Position, lat 29° 57′ 35″ N., long. 32° 32′ 10″ E.

Note.—Approaching from southward, this leading light should be kept just open westward of Newport rock light, and be steered for, passing the Newport rock light-vessel at the distance of about 2 cables—the leading light must then be kept in sight till the Spit buoy is passed. *Variation, 4¾° W.*

373.—INDIA.—*West Coast.—Calicut.—Buoys marking limits of Foul Ground.*—Two black buoys have been laid down in Calicut roadstead to mark the limits of foul ground. Vessels must anchor in such a position that they will not swing in-shore of these buoys at any time.

374.—JAPAN.—*Yezo.—Hakodadi Lightship.— Caution.* —Complaints having been received of the difficulty of distinguishing the light exhibited from the Hakodadi lightship from the lights exhibited by the many vessels that anchor in its immediate neighbourhood, it is requested that vessels anchoring to the westward of a line drawn from the lightship to the Cape south-west of the fort, and called "White Bluff" on English charts, or to the westward of the bearing N.N.E. from the lightship, do give the lightship a clear berth of at least 5 cables (8·5 chos). To the eastward of these lines there is no restriction as to anchorage.

375.—SOUTH AUSTRALIA.—*Investigator Strait.—Nepean Bay.—Kangaroo Island.—Buoy marking submarine cable.*—A large cheese-shaped buoy with cylindrical framework, surmounted by a ball and painted red, has been moored off the end of the sandspit in latitude 35° 41′ 30″ S., and longitude 137° 42′ 35″ E., for the purpose of marking the submarine cable between Kingscote and Yankalilla. Masters of vessels when running into Kingscote harbour for shelter, are requested to anchor to the southward or well to the westward of the buoy, in order to avoid the cable. Masters of coasters or small craft using the inside anchorage, are informed that two beacons have been erected on Bear Point; when

in line they mark the position of the cable, and bear from each other N. 67° W. and S. 67° E. It is particularly requested that masters will keep well to the north or south of this line before anchoring.

376.—South Australia.—*Beachport.—North End of Rivoli Bay.—Buoy.*—A cheese-shaped buoy, surmounted by a staff and ball painted black, has been moored off Glen point in 16 feet of water, at low water, on the following bearings from the buoy, viz.:—Glen point, N. 64° 40′ W., and south end of Penguin Island, S. 36° W. Masters of vessels bound to the anchorage at Beachport should leave the buoy on the port hand at a distance of two cables' length.

377.—South Australia.—*Gulf of St. Vincent.—Outer Bar, entrance to Port Adelaide.*—The Outer Bar channel, at the entrance to Port Adelaide, has been deepened to not less than 18½ feet at low water, for a width of about 220 feet.

378.—South Australia.—*Spencer Gulf.—Buoy on Ward Spit.*—The red buoy, which marked the S.W. edge of Ward Spit, has been removed, and a buoy, painted black, has been moored in the same position.

379.—South Australia.—*Spencer Gulf.—Germein Bay.—Port Pirie.*—The following remarks are published for the information and guidance of masters of vessels bound to the anchorage in Germein Bay or to Port Pirie:—The *south side of the channel* is marked by a pile beacon surmounted by a ball, painted red, and erected on the north end of Eastern shoal, in lat. 33° 4′ 50″ S., and long. 137° 41′ 45″ E. The course from the above beacon to a cheese-shaped buoy, surmounted by cylindrical framework and ball, painted red, is E. by N. ½ N., distant six miles. This buoy is moored in four fathoms at low water, on the N.W. or outer edge of the Cockle Spit. From this buoy, a course of E. by N. will lead to a pile beacon, surmounted by a ball painted red, distant one mile. From the beacon, a course of E. by S., distant three-quarters of a mile, will lead to a cheese-shaped buoy, surmounted by cylindrical framework and ball, painted red. This buoy is moored on the northern or outer edge of the Cockle Spit, in three fathoms at low water.

Proceeding on a course of E. by S. from the last-mentioned buoy, and distant from it one mile, another cheese-shaped buoy, surmounted by staff and ball, painted red, will be observed; it is moored in 15 ft. at low water. From thence a course of S.E. by S., distant two and three-quarter miles, will lead to the fairway buoy, which is cheese-shaped, surmounted by cylindrical framework and ball, painted in black and red chequers. This buoy marks the entrance to Port Pirie harbour, and can be passed on either side; it is moored in 10 ft. at low water.

The north side of the channel is marked as follows:—A cheese-shaped buoy, surmounted by staff and ball, painted black, is moored in 12 ft. at low water on the S.W. edge of Ward Spit: lat. 33° 2′ 40″ S., long. 137° 49′ 45″ E. A short half-mile to the eastward of this buoy will be observed a pile beacon with square head, painted black; it is in 10 ft. at low water. From this beacon, a course of E. ½ N., distant two and a half miles, will lead to a cheese-shaped buoy surmounted by staff and ball, painted black, and moored in three fathoms on the south edge of Ward Spit. From this buoy, a course of E. by N. ½ N., distant two and a quarter miles, will lead to another black buoy of the same description, placed on the S.E. edge of Ward Spit, and moored in three fathoms at low water. Large ships intending to bring up in the outer roadstead, should be prepared to anchor after passing this buoy.

880.—Australia.—*Bass Strait.—King Island.—Intended Light at Currie Harbour.*—With reference to previous Notice, the light from a lighthouse in course of construction on the south side of Currie harbour, west coast of King Island, will be exhibited on March 1st, 1880. It will be a *flashing* light, showing five flashes and eclipses alternately in a *minute*, and elevated 150 feet above the sea. The lighthouse, 70 feet high, constructed of iron, with central tube for staircase, is supported on 6 iron columns. Position approximate, lat. 39° 56′ S., long. 143° 51′ E.

881.—West Indies.—*Haïti.—Santo Domingo.—Alteration in Light.*—The following alteration has been made in the character of the light exhibited at fort San José:—It is now a *revolving* light, showing a flash *every minute*, alternate *red* and *white;* visible from a distance of 15 miles.

382.—West Indies.—*Haïti.—North Coast.—Light at Port Plata.*—On 20th October, 1879, a light would probably be exhibited from a lighthouse recently erected on the eastern entrance point of that harbour; it is a *revolving white* light, elevated 137 feet above the sea. The lighthouse, 74 feet high, octagonal in shape and constructed of iron, is situated in a S.S.E. direction from the extremity of the point, distant 350 yards. Position approximate, lat. 19° 49′ 15″ N., long. 70° 41′ 15″ W.

383.—North Atlantic.—*Bermuda Island.—St. David Island.—Light near St. David Head.*—On 3rd November, 1879, a light would be ready for exhibition from a lighthouse recently erected on Mount hill, about one-third of a mile south-west of St. David head, eastern end of St. David island. It will be a *fixed white* light, elevated 208 feet above the sea, and visible seaward of the N.E. part of the Bermuda islands and their encircling reefs, through an arc of 270°, or between the bearings N. 52° E. and S. 38° E. On a bearing of S. 34° E., the light will be interrupted by the land about fort Victoria, St. George island. The lighthouse, 55 feet high, is white and octagonal in shape. Position, lat. 32° 21′ 40″ N., long. 64° 40′ 35″ W. *Variation*, 8° W.

384.—United States.—*Florida.—Automatic Signal-Buoy off Cape Canaveral.*—An automatic signal-buoy, painted black, giving blasts of a whistle at short intervals, has been moored three-quarters of a mile east of Ohio shoal, off Cape Canaveral, Florida, in 9 fathoms water.

385.—United States.—*Chesapeake Bay.—Tangier Sound Entrance.—Light in Hooper Strait.*—A light is now exhibited from a screw-pile lighthouse recently erected on the northern side of Hooper strait, between the mainland and Bloodsworth island. It is a *fixed white* light, elevated 40 feet above high water, and visible from a distance of 11 miles. The superstructure of the lighthouse is painted white with red lantern; roof and foundation brown. Position approximate, lat. 38° 13′ 30″ N., long. 76° 4′ 10″ W.

Note.—This light serves as a guide through Hooper strait into Tangier sound, and is intended to replace the one destroyed by ice on 11th January, 1877.

Fog-Signal.—From this lighthouse, during thick and foggy weather, a bell will be struck by machinery every *twelve seconds.*

386.—United States.—*New Jersey.—Automatic Signal-Buoy off Five-Fathom Bank.*—An automatic signal-buoy, painted red, and giving blasts of a whistle at short intervals, has been moored off the N.E. end of Five-Fathom Bank, coast of New Jersey, in 9 fathoms water. Bearings and distances of prominent objects are as follows:—Hereford Inlet lighthouse, W.N.W. ½ W., 12 miles; Five-Fathom Bank lightship, S.S.W., 9⅛ miles. Vessels of deep draught should pass to seaward of the buoy.

387.—United States.—*Maine.—Automatic Signal-Buoy in outer Casco Bay.*—An automatic signal-buoy, painted red, with H. R. in black letters, giving blasts of a whistle at short intervals, has been moored in 19 fathoms water, off Half-way rock, in the outer Casco bay, coast of Maine. Bearings of prominent objects are as follows:—Half-way rock light, N.W. ¼ N.; Little Mark island monument, N. ⅝ E.; Junk of Pork island, W. by N. ⅛ N.

388.—Canada.—*Bay of Fundy.—Grand Manan Island.—Grand Harbour, Light on Fish Fluke Point.*—Exhibited from a lighthouse recently erected on Fish Fluke Point, eastern side of Grand Harbour, Grand Manan Island; it is a *fixed white* light, elevated 40 feet above high water, and visible between the bearings North (through east) and S.W., from the distance of 11 miles. The lighthouse, 32 feet high, constructed of wood and painted white, consists of a square tower with keeper's dwelling attached. Position, lat. 44° 40′ N., long. 66° 45′ W.

389.—Canada.—*Nova Scotia.—Range Lights at Harbour au Bouche.*—The front building, on the S.W. shore of the harbour, is a square wooden tower, painted white, and 32 ft. high; it shows a *fixed white* light, elevated 36¼ feet above high water. The back tower, which is similar to the front one, is distant from the latter nearly a quarter of a mile in a S. 37° W. direction, and shows a *fixed red* light, elevated 107 feet above high water. Position, lat. 45° 41′ N., long. 61° 31′ 15″ W. Both lights are visible about 9 miles.

Note.—These two lights, when in one, indicate the position of the dredged channel entering Harbour au Bouche.

890.—NEWFOUNDLAND.—*St. Pierre Island.—Galantry Head Light.—Colour of flashes and range of visibility.*—This light now shows *white* flashes, visible from a distance of 18 miles.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, 1879.

No. 22.—NEWFOUNDLAND PILOT; information relating to the coasts of Newfoundland and Labrador.

No. 23.—MEDITERRANEAN SEA; information relating to Problaka bay, gulf of Monte Santo; and to Deuthero cove, coast of Roumelia.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC DEPARTMENT, ADMIRALTY, IN SEPTEMBER AND OCTOBER, 1879.

No.		*s.*	*d*
882	England, south coast: —Tamar river	1	6
1559	Adriatic sea:—Ports and anchorages in Istria ...	1	6
928	Eastern archipelago:—Sulu archipelago (plans, Sulu roadstead; Maimbun and Lamenusa anchorages)	2	6
201	Adriatic sea:—Gulfs of Venice and Trieste, from the mouths of the river Po to cape Promontore ...	4	0
2364	Baltic:—Lubeck bay and Femern belt (plan, Trave river)	2	6
2762	Indian ocean:—Comoro islands, with the adjacent coasts of Africa and Madagascar (plans, Fumboni bays and road; Numa Choa anchorage; Johanna road; Pomony harbour)	2	6
1258	Korea, west coast:—Approaches to Séoul	2	0
897	Africa, west coast:—Milkbosch point to Orange river (plan, Mac Dougall harbour)	1	6
1001	Africa, west coast:—St. Louis or Guetn'dar anchorage and Senegal bar. Goree road and harbour	1	6
1640	Plan of Vy-Py-Hay removed, and plans of Hana-Menu, Hana-Iapa, Hana-Vave, and Taa-Hu-Ku added.		
1033	Plan of Jurien bay added.		
Book.—Tide Tables for 1880	... ...	1	6

OUR OFFICIAL LOG.

Official Inquiries at Home, 1879.

(*This List is completed to the* 18*th of each Month.*)

397. *Brest*, s.s.; built at Port Glasgow, in 1874; owned by the Cunard Steamship Company, Limited; tonnage, 1,472; Havre to Liverpool; passengers and cargo; lost near Beast Point, Cornwall, September 6, 1879. Inquiry held at Falmouth, September 24, 1879, before Rothery, Wreck Commissioner, Parfitt and White, N.A. Casualty due to the wrongful acts of the master in steering improper courses and in neglecting to use the lead, and also for running at full speed in a fog. Certificate suspended for six months, and recommended for one as chief officer during his suspension.

400. *Duke of Wellington*, barque; built at Liverpool, 1842; owned by Mr. W. S. Lishman and another, of Newcastle; tonnage, 794; Shields to Carthagena; coals; lost in Newark Bay, September 7, 1879. Inquiry held at North Shields, October 8, 1879, before Wait and Jackson, Justices; Holt and Castle, N.A. Casualty attributable to the master running in thick weather, without being able to verify his position. Certificate suspended for three months.

401. *Crimea*, brig; built at Southdown in 1851; owned by A. Chalmers, the master; tonnage, 175; Huelva to Runcorn; copper ore; lost near Lagos, coast of Portugal, August 18, 1879. Inquiry held at Arbroath, October 7, 1879, before Laird and Traill, J.P.; Burnett and Ward, N.A. Court found that the vessel was wilfully stranded, and that both master and mate were culpable. Both certificates cancelled.

402. *Mary Ellen;* built at Souris, Prince Edward Island, 1862; owned by Thomas Jones, Carnarvon; tonnage, 97; Dinorwick to Burghhead; slates; stranded on reef in the Sound of Islay, September 21, 1879. Inquiry held at Greenock, October 11, 1879, before Neill and Thomson, J.P.; Grant and Nicolas, N.A. Master guilty of an error of judgment only. Certificate not dealt with.

405. *Cardenas*, barque; built at Alloa, 1868; owned by Mr. W. Kennett; tonnage, 322; Trinidad to United Kingdom; molasses; stranded on the Runnel Stone, Lands End, September 19, 1879. Inquiry held at Greenwich, October 10, 1879, before Balguy, Stip. Mag.; White and Parfitt, N.A. Accident due to an error of judgment. Master's certificate returned.

406. *Harriet*, brigantine; built at New Shoreham, in 1843; owned by Mr. F. Hilbery, of London; tonnage, 152; London to West Coast of Africa; general cargo; lost at the mouth of the River Volta, August 2, 1879. Inquiry held at Westminster, October 3, 1879, before Rothery, Wreck Commissioner; Powell and Nicolas, N.A. Master in default for improper and unseamanlike navigation. Certificate suspended for six months, and recommended for one as mate.

407. *Malakoff* and *Erith*, s.s.; the former a fishing lugger built at Newlyn, Cornwall, 1868; owned by Mr. P. Williams; tonnage, 18; on a fishing cruise. The latter built at Sunderland, 1875; owned by Mr. W. A. Watson and others; tonnage, 686; London to Seaham; ballast; in collision off Robin Hood's head, September 18, 1879, when the *Malakoff* was sunk. Inquiry held at Westminster, October 8, 1879, before Rothery, Wreck Commissioner; Powell and Hight, N.A. Accident due to the *Malakoff* not exhibiting her side-lights as well as her masthead light; and also from the *Erith* proceeding at too high a speed; and from that vessel starboarding her helm instead of porting, when she perceived that the *Malakoff* was under way. No certificates held by master of *Malakoff* or chief officer of *Erith*.

409. *Langdale*, ship; built at Liverpool, 1874; owned by Mr. J. D. Newton; tonnage, 1,236; San Francisco to United Kingdom; wheat in bags; lost on Combe rocks, Carnsore point, September 27, 1879, when loss of life ensued. Inquiry held at Liverpool, October 16, 1879, before Raffles, Judge; Harris and White, N.A. Casualty due to the master (drowned) mistaking the light of the Coningbeg light-vessel for that on the Tuskar.

416. *Pleiades*, s.s., and *Racer*; the former an iron vessel built in 1874; owned by the Star Navigation Company, Liverpool; tonnage, 1,457; Colombo to London; passengers and cargo. The

latter a fishing lugger returning from a fishing cruise; in collision off the North Foreland, September 26, 1879, by which the *Racer* was sunk, and one life was lost. Inquiry held at Greenwich, October 18, 1879, before Balguy, Stip. Mag.; Forster and Curling, N.A. The Court held that the pilot in charge was solely to blame for the casualty.

417. *W. R. Rickett*, s.s.; stranded on the Ostby shoal, Island of Oland, August 16, 1879, when on a voyage from Cronstadt to Bremerhaven with a cargo of rye. Inquiry held at Sunderland, October 21, 1879, before Booth and Ritson, J.P.; Harris and Hight, N.A. Casualty caused by an unknown current and sudden dense fog. Master's certificate returned.

421. *Czar*, s.s.; built at Lower Walker, 1857; owned by Mr. J. S. Scotter and others; tonnage, 324; lost on the rocks off Souter point, October 5, 1879. Inquiry held at Hull, October 28, 1879, before Travis, Judge; Knox and Sceales, N.A. Master in default for neglect of the lead, and for want of care in navigating his vessel. Certificate suspended for three months.

Official Inquiries Abroad.

399. *Illimani*, s.s.; wrecked to the southward of Mocha Island, July 18, 1879. Naval Court held at Valparaiso, August 9, 1879. Master censured for lack of prudence, but his certificate was returned.

403. *Lizzie English*, s.s.; lost in the Black Sea. Naval Court held at Constantinople, October 1, 1879. Master to blame. Certificate suspended for six months. Mate's certificate cancelled.

404. *Mabel Young*, barque; lost at sea, July 31, 1879, Inquiry held at Mossel Bay, August 19, 1879. Accident due to heavy squall. Master free from blame.

408. *Mic Mac;* stranded at Point Seal, July 1, 1879. Inquiry held at Port Elizabeth, July 15, 1879. Accident due to master navigating with obsolete books and charts, for which he was censured.

410. *Thessaly*, s.s.; lost on the Azalia Rock, near Perim Island, June 17, 1879. Inquiry held at Aden, August 5, 1879. Master

to blame for reckless navigation. Certificate suspended for three months.

411. *Lady of the Lake*, schooner; lost at sea, July 30, 1879. Inquiry held at Sydney, August 11, 1879. No evidence on which to found a charge against the master.

412. *Emily McLaren*, barque ; abandoned at sea, August 16, 1879. Naval Court held at Valparaiso, September, 1879. Abandonment justifiable.

413. *Ananda*, s.s. ; boiler burst, May 28, 1879, off Pulo Jerajah. Inquiry held September 4, 1879, at Penang. Master and officers found in default, and were punished as follows:—Master's certificate suspended for three months; chief officer's certificate suspended for three months ; chief engineer's certificate suspended for six months ; second engineer's certificate cancelled.

414. *Windward*, schooner; stranded on the Three Hummock island, July 2, 1879. Inquiry held at Stanley, July 24, 1879. Master guilty of want of caution. Certificate suspended for three months.

415. *Charlotte Gladstone*, ship; abandoned at sea. Inquiry held at Cape Town, September 5, 1879. Abandonment justifiable. Master's certificate returned.

418. *Urania*, s.s.; Naval Court held at Gijon, October 11, 1879, to inquire into the alleged unseaworthiness of the vessel. Court held that she was only sufficiently seaworthy to return to England in ballast for repairs. Owner condemned in costs of inquiry.

419. *Chefoo*, s.s.; grounded off Ochsen island, August 19, 1879. Naval Court held September 1, 1879. Master guilty of an error of judgment, and was reprimanded.

420. *Clifford*, brigantine; lost on the island of Gracioza, September 23, 1879. Inquiry held at Fayal, October 13, 1879. Chief mate to blame (uncertificated) ; ordered to pay costs of inquiry.

SOUTH AFRICA, WEST COAST.

[We publish for the information of mariners navigating the South West Coast of South Africa the following important information which has been officially forwarded to us.]

Commodore Richards, R.N., to Governor Sir H. B. E. Frere, Bart., G.C.B., G.C.S.I.

Boadicea, in Simon's Bay, 2nd October, 1879.

Sir,—I have the honour to forward herewith for your Excellency's information, a copy of a letter with Track Chart from Commander Caffin, R.N., reporting having experienced a strong indraught between Cape Hanglip and Danger Point, on his passage from Simon's Town to Durban in the hired transport *Natal*, on the 19th ult., which appears to be of sufficient importance to warrant its publication in the Government Gazette for the information of masters of vessels.—I have the honour to be,

Your Excellency's most obedient servant,

(Signed) FRED. W. RICHARDS,

Commodore.

To His Excellency

The Right Hon. Sir Bartle Frere, Bart., G.C.B., &c., &c.

Hydrographic Information Reporting Strong Indraught between Cape Hanglip and Danger Point, Cape Colony.

H.M.'s Hired Transport, *Natal*,

Durban, 24th September, 1879.

Captain Guy O. Twiss, R.N.,

Principal Transport Officer, Durban.

Sir,—I have the honour to report that at 7 a.m. on the morning of the 19th instant, I passed Cape Hanglip, bearing E. by N. ½ N. (mag.) four miles distant and shaped S.S.E. course (mag.) to pass seven miles outside the Birkenhead Rock, off Danger Point, but shortly afterwards it became very thick and raining, and prevented the land being seen until a sudden change at 9.30 enabled our position to be obtained by cross bearings, when we found we had experienced an easterly set of four miles in the two hours and a half, and had we continued in the same course, experiencing the same rate of set, we should have barely cleared the "Birkenhead" Rock. The

wind at the time was west, force 4, with a long S.W., swell, ship steaming with fore-and-aft sails set, at the rate of seven knots. I was quite satisfied that the deviation of compass was correct, and having been on deck very frequently, had satisfied myself that the course was correctly steered. I consider it most important that this should be made known, as in all probability the *Birkenhead*, *Clyde* and *Celt* owe their loss to the same indraught. Again Captain Gilbert, master of this ship, reports to me that on the 11th May he passed Danger Point, distant four miles, in daylight, and a smooth sea, no wind, and shaped a course S.E. by S. (mag.) to pass the Quoin Point the same distance, and after an hour and a half, ship steaming at the rate of eight knots an hour, he was astonished to find the low land off Quoin Point nearly a-head.

I have the honour to be, Sir, your obedient servant,
(Signed) CRAWFORD CAFFIN,
Comm. R.N. and Transport Officer Afloat.

Naval Transport Office, Durban, 25th September, 1879.

Royal Naval Reserves.—We have to notify the fact that Rear-Admiral H.R.H. the Duke of Edinburgh, K.G., has relieved Vice-Admiral Phillimore as Superintendent of the Royal Naval Reserves, and that Captain Whyte, late Flag-Captain at Plymouth, is appointed as Flag-Captain to His Royal Highness to carry on business at the office in Spring Gardens, while the Superintendent is absent on inspecting duty. The despatch vessel *Lively* is being fitted for service as the Admiral's tender, in lieu of the *Hawk* hitherto employed. We do not know whether this appointment has any special significance, but we may anticipate that the Duke will, with that thoroughness which has characterised his naval service, introduce some necessary reforms in regard to the coastguard, and further the development of the Royal Naval Reserve establishment, so as to bring into closer relations the Royal and Mercantile Marine Services. His Royal Highness's important position as Master of the Trinity House would seem to point to this as an appropriate field for his labours.

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BOOKS, NOTICES OF.

OFFICIAL INQUIRIES AT HOME AND ABROAD.

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